Vol. 1121 Number 3

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of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

1790 ***Celebrating 200 Years of Creativity*** 1990

PATENTS

December 18, 1990

U.S.
DEPARTMENT
OF COMMERCE

Patent
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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

December 18, 1990 Volume 1121 Number 3

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1121 OG 30
Notice of Maintenance Fees Payable	1121 OG 30
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1121 OG 31
Notification of Acceptance of Delayed Payment of Maintenance Fee	1121 OG 33
Reissue Applications Filed	1121 OG 33
Requests for Reexaminations Filed	1121 OG 33
Interim Rule	1121 OG 34
Extention of Existing Interim Orders	1121 OG 35
Errata	1121 OG 36
Service by Publication	1121 OG 37
Patent Certificates of Correction	1121 OG 38
Disclaimers	1121 OG 38
Disclaimer and Dedication	1121 OG 38
Special Boxes for Mail	1121 OG 39
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1121 OG 40
Condition of Patent Applications	1121 OG 42
Reexaminations	1207
Reissue Patents Granted (33,490)	1209
Plant Patents Granted (7,396)	1213
Patents Granted	
General and Mechanical (4,977,621)	1215
Chemical (4,978,361)	1463
Electrical (4,978,812)	1591
Design Patents Granted (312,913)	1739
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design, and Plant Patentees	PI 66
Classification of	
Patents (Including Reissues, and Reexaminations)	PI 73
Designs, and Plants Applications	PI 76
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 77
Designs and Plant Applications	PI 79
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

[26] In the case of a suggestion for rehearing en banc, we obtain approval from the Solicitor General.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Nov. 1, 1990, and was announced in the *Official Gazette* at 1119 O.G. 54 on Oct. 23, 1990.

International fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1344.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Sept. 24, 1990 HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on December 15, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,712,251 through 4,713,841
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on December 13, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,419,771 through 4,420,842
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended effective Apr. 17, 1989, and in 37 CFR 1.20(h) and (i), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$415.00
By other than a small entity.....$850.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$835.00
By other than a small enttity.....$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), as amended effective Apr. 17, 1989, which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 7, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
]Re. 32,173	06/554,524	6/10/86
(4,352,266)	(06/247,403)	(10/05/82)
4,352,232	06/233,972	10/05/82
4,352,256	06/238,709	10/05/82
4,352,282	06/226,945	10/05/82
4,352,306	06/284,952	10/05/82
4,352,307	06/284,953	10/05/82
4,352,352	06/256,791	10/05/82
4,352,384	06/255,509	10/05/82
4,352,425	06/256,536	10/05/82
4,352,453	06/226,567	10/05/82
4,352,469	06/282,647	10/05/82
4,352,476	06/277,354	10/05/82
4,352,486	06/250,235	10/05/82
4,352,495	06/232,719	10/05/82
4,352,511	06/234,702	10/05/82
4,352,525	06/261,463	10/05/82
4,352,565	06/224,184	10/05/82
4,352,571	06/242,556	10/05/82
4,352,626	06/219,077	10/05/82
4,352,629	06/312,604	10/05/82
4,352,647	06/218,113	10/05/82
4,352,654	06/218,816	10/05/82
4,352,659	06/279,521	10/05/82
4,352,660	06/226,476	10/05/82
4,352,665	06/224,068	10/05/82
4,352,676	06/242,434	10/05/82
4,352,684	06/280,397	10/05/82
4,352,719	06/230,506	10/05/82
4,352,730	06/228,474	10/05/82
4,352,733	06/218,985	10/05/82
4,352,743	06/305,536	10/05/82
4,352,752	06/240,983	10/05/82
4,352,757	06/230,915	10/05/82
4,352,759	06/258,840	10/05/82
4,352,760	06/220,598	10/05/82
4,352,763	06/310,541	10/05/82
4,352,767	06/220,428	10/05/82
4,352,773	06/272,793	10/05/82
4,352,776	06/230,317	10/05/82
4,352,787	06/275,655	10/05/82
4,352,795	06/229,471	10/05/82
4,352,806	06/321,032	10/05/82
4,352,809	06/299,435	10/05/82
4,352,844	06/268,207	10/05/82
4,352,845	06/307,887	10/05/82
4,352,860	06/261,558	10/05/82
4,352,864	06/251,488	10/05/82
4,352,899	06/250,676	10/05/82
4,352,906	06/290,524	10/05/82
4,352,922	06/240,025	10/05/82
4,352,930	06/276,768	10/05/82
4,352,932	06/227,279	10/05/82
4,352,933	06/232,105	10/05/82
4,352,935	06/323,992	10/05/82
4,352,944	06/223,418	10/05/82
4,352,947	06/289,406	10/05/82
4,352,991	06/261,727	10/05/82
4,353,004	06/225,187	10/05/82
4,353,044	06/223,033	10/05/82
4,353,091	06/216,862	10/05/82
4,353,099	06/242,954	10/05/82
4,353,113	06/245,660	10/05/82
4,353,114	06/249,390	10/05/82
4,353,115	06/276,273	10/05/82
4,353,123	06/227,993	10/05/82
4,615,047	06/793,278	10/07/86
4,615,053	06/686,159	10/07/86
4,615,054	06/748,327	10/07/86
4,615,056	06/757,169	10/07/86
4,615,066	06/735,617	10/07/86
4,615,073	06/638,710	10/07/86
4,615,078	06/733,064	10/07/86
4,615,081	06/616,136	10/07/86
4,615,086	06/679,933	10/07/86
4,615,095	06/788,384	10/07/86
4,615,101	06/709,596	10/07/86
4,615,105	06/636,740	10/07/86
4,615,117	06/667,973	10/07/86
4,615,121	06/679,953	10/07/86
4,615,125	06/655,421	10/07/86
4,615,126	06/632,416	10/07/86
4,615,129	06/808,069	10/07/86
4,615,156	06/693,373	10/07/86

Patent Number	Serial Number	Issue Date
4,615,170	06/766,866	10/07/86
4,615,174	06/698,481	10/07/86
4,615,178	06/679,684	10/07/86
4,615,180	06/754,278	10/07/86
4,615,181	06/766,300	10/07/86
4,615,182	06/616,962	10/07/86
4,615,183	06/748,207	10/07/86
4,615,185	06/692,253	10/07/86
4,615,187	06/621,772	10/07/86
4,615,192	06/633,623	10/07/86
4,615,196	06/753,343	10/07/86
4,615,201	06/620,469	10/07/86
4,615,210	06/729,866	10/07/86
4,615,219	06/765,058	10/07/86
4,615,221	06/751,395	10/07/86
4,615,222	06/638,753	10/07/86
4,615,228	06/733,929	10/07/85
4,315,230	06/700,700	10/02/86
4.615,234	06/693,555	10/07/86
4,615,238	06/757,239	10/06/86
4.615,242	06/766,240	10/07/86
4,615,243	06/647,704	10/08/86
4,615,245	06/571,395	10/07/86
4,615,253	06/417,416	10/07/86
4,615,254	06/768,527	10/07/86
4,615,261	06/665,700	10/07/86
4,615,263	06/688,573	10/07/86
4,615,269	06/685,890	10/07/86
4,615,270	06/724,433	10/07/86
4,615,377	06/564,592	10/07/86
4,615,281	06/769,111	10/07/82
4,615,284	06/625,597	10/07/86
4,615,286	06/732,165	10/07/86
4,615,297	06/768,635	10/07/86
4,615,322	06/475,808	10/07/86
4,615,334	06/755,345	10/07/86
4,615,335	06/672,136	10/07/86
4,615,343	06/645,438	10/07/86
4,615,347	06/621,703	10/07/86
4,615,349	06/730,813	10/07/86
4,615,351	06/626,655	10/07/86
4,615,359	06/500,073	10/07/86
4,615,365	06/799,156	10/07/86
4,615,369	06/830,161	10/07/86
4,615,391	06/640,384	10/07/86
4,615,399	06/799,611	10/07/86
4,615,406	06/595,261	10/07/86
4,615,408	06/688,130	10/07/86
4,615,409	06/685,337	10/07/86
4,615,418	06/751,466	10/07/86
4,615,431	06/635,431	10/07/86
4,615,433	06/742,718	10/07/86
4,615,434	06/638,399	10/07/86
4,615,443	06/688,291	10/07/86
4,615,453	06/761,404	10/07/86
4,615,457	06/776,521	10/07/86
4,615,481	06/664,338	10/07/86
4,615,487	06/600,439	10/07/86
4,615,492	06/627,062	10/07/86
4,615,498	06/678,572	10/07/86
4,615,501	06/728,389	10/07/86
4,615,502	06/663,035	10/07/86
4,615,507	06/724,657	10/07/86
4,615,508	06/668,633	10/07/86
4,615,509	06/790,608	10/07/86
4,615,512	06/755,889	10/07/86
4,615,514	06/696,069	10/07/86
4,615,516	06/776,667	10/07/86
4,615,520	06/593,648	10/07/86
4,615,522	06/630,534	10/07/86
4,615,523	06/746,557	10/07/86
4,615,525	06/604,511	10/07/86
4,615,527	06/633,486	10/07/86
4,615,528	06/699,646	10/07/86
4,615,532	06/650,587	10/07/86
4,615,533	06/707,652	10/07/86
4,615,540	06/688,843	10/07/86
4,615,543	06/660,801	10/07/86
4,615,552	06/696,213	10/07/86
4,615,565	06/635,404	10/07/86
4,615,580	06/586,027	10/07/86
4,615,591	06/600,146	10/07/86
4,615,618	06/622,840	10/07/86
4,615,621	06/364,681	10/07/86
4,615,623	06/653,555	10/07/86
4,615,624	06/761,002	10/07/86
4,615,628	06/719,152	10/07/86
4,615,634	06/685,144	10/07/86
4,615,641	06/637,367	10/07/86
4,615,651	06/642,554	10/07/86
4,615,653	06/739,308	10/07/86
4,615,655	06/743,954	10/07/86
4,615,659	06/545,042	10/07/86
4,615,675	06/794,726	10/07/86
4,615,685	06/645,219	10/07/86
4,615,686	06/752,292	10/07/86
4,615,692	06/784,953	10/07/86
4,615,693	06/593,970	10/07/86
4,615,700	06/649,981	10/07/86
4,615,701	06/670,044	10/07/86
4,615,704	06/674,457	10/07/86
4,615,708	06/789,298	10/07/86
4,615,719	06/650,595	10/07/86
4,615,725	06/720,827	10/07/86
4,615,726	06/682,795	10/07/86
4,615,727	06/500,381	10/07/86
4,615,730	06/729,002	10/07/86
4,615,732	06/766,729	10/07/86
4,615,736	06/729,728	10/07/86
4,615,743	06/640,227	10/07/86
4,615,777	06/444,299	10/07/86
4,615,785	06/733,982	10/07/86
4,615,794	06/642,400	10/07/86
4,615,802	06/666,776	10/07/86
4,615,807	06/757,971	10/07/86
4,615,809	06/734,021	10/07/86
4,615,810	06/719,685	10/07/86
4,615,837	06/321,850	10/07/86
4,615,841	06/727,055	10/07/86
4,615,849	06/555,867	10/07/86
4,615,855	06/589,881	10/07/86
4,615,858	06/734,435	10/07/86
4,615,866	06/635,295	10/07/86
4,615,871	06/736,157	10/07/86
4,615,872	06/716,390	10/07/86
4,615,874	06/716,440	10/07/86
4,615,877	06/583,859	10/07/86
4,615,879	06/551,003	10/07/86
4,615,882	06/729,560	10/07/86
4,615,887	06/590,765	10/07/86
4,615,901	06/666,536	10/07/86
4,615,910	06/723,434	10/07/86
4,615,950	06/712,308	10/07/86
4,615,956	06/804,561	10/07/86
4,615,968	06/545,555	10/07/86
4,615,979	06/473,788	10/07/86
4,615,985	06/601,142	10/07/86
4,615,994	06/403,237	10/07/86
4,615,999	06/762,974	10/07/86
4,616,000	06/763,868	10/07/86
4,616,007	06/755,225	10/07/86
4,616,014	06/433,513	10/07/86
4,616,015	06/598,685	10/07/86
4,616,018	06/749,580	10/07/86
4,616,035	06/661,008	10/07/86
4,616,036	06/775,415	10/07/86
4,616,045	06/733,314	10/07/86
4,616,084	06/636,470	10/07/86
4,616,091	06/817,791	10/07/86
4,616,098	06/649,977	10/07/86
4,616,100	06/574,052	10/07/86
4,616,116	06/709,448	10/07/86
4,616,122	06/496,875	10/07/86
4,616,123	06/670,766	10/07/86
4,616,125	06/695,839	10/07/86
4,616,139	06/613,899	10/07/86

Patent Number	Serial Number	Issue Date
4,615,140	06/550,174	10/07/86
4,616,151	06/679,244	10/07/86
4,616,169	06/720,868	10/07/86
4,616,175	06/572,944	10/07/86
4,616,188	06/746,860	10/07/86
4,616,192	06/722,891	10/07/86
4,616,194	06/715,822	10/07/86
4,616,213	06/458,142	10/07/86
4,616,223	06/557,574	10/07/86
4,616,246	06/443,206	10/07/86
4,616,248	06/735,928	10/07/86
4,615,272	06/710,862	10/07/86
4,616,273	06/663,398	10/07/86
4,616,280	05/521,071	10/07/86
4,616,288	06/581,354	10/07/86
4,616,292	06/757,494	10/07/86
4,616,301	06/605,524	10/07/86
4,616,321	06/536,053	10/07/86
4,616,330	06/526,562	10/07/86
4,616,349	06/443,504	10/07/86
4,616,351	06/427,915	10/07/86
4,616,361	06/602,205	10/07/86
4,616,362	06/632,423	10/07/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1), and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptence Date
Re.32,850	06/839,045	1/31/89	3/12/86	11/13/90
(4,460,256)	(06/323,686)	(7/17/84)	(11/20/81)	
4,578,886	06/616,077	6/01/84	4/01/86	11/13/90
4,568,007	06/573,295	2/04/86	1/23/84	10/31/90
4,586,209	06/405,443	5/06/86	8/05/82	10/31/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,582,927, Re. S. N. 07/610,662, Filed Nov. 8, 1990, Cl. 560/201, SNYTHETIC COOKING OILS CONTAINING DICARBOXYLIC ACID ESTERS, John G. Fulcher, Owner of Record: *Frito-Lay, Inc., Dallas, Tex.*, Attorney or Agent: Barbara G. Ernst, Ex. Gp.: 126

4,725,480, Re. S. N. 07/608,507, Filed Nov. 2, 1990, Cl. 428/210, HERMETICALLY SEALED ELECTRONIC COMPONENT, I. Macit Gurol, Owner of Record: *Horn Fluke Mfg., Co., Inc., Everett, Wash.*, Attorney or Agent: Benjamin J. Hauptman, Ex. Gp.: 158

4,731,952, Re. S. N. 07/504,756, Filed Mar. 12, 1990, Cl. 49/380, DOOR FRAME HAVING ADJUSTABLE THRESHOLD MEMBER, Lawrence L. Mascotte, Owner of Record: *Inventor*, Attorney or Agent: Adrian J. LaRue, Ex. Gp.: 358

4,767,026, Re. S. N. 07/574,838, Filed Aug. 29, 1990, Cl. 222/137, DISPENSING AND MIXING APPARATUS, Wilhelm A. Keller, et al., Owner of Record: *Inventors*, Attorney or Agent: Gerald H. Kiel, Ex. Gp.: 314

4,772,503, Re. S. N. 07/584,998, Filed Sept. 19, 1990, Cl. 428/79, NOVELTY UPPER TORSO GARMENT, Lawrence Donsky, Owner of Record: *Lomar Internation Corp., New York, N.Y.*, Attorney or Agent: Myron Amer, Ex. Gp.: 158

4,780,080, Re. S. N. 07/602,841, Filed Oct. 24, 1990, Cl. 433/173, ADJUSTABLE DENTOALVEOLAR IMPLANT SYSTEM, Andras Haris, Owner of Record: *Facial Alveodental Implant Rehabilitation, Inc., Bala Cynwyd, Pa.*, Attorney or Agent: Eugene Chovanes, Ex. Gp.: 333

4,783,645, Re. S. N. 07/610,412, Filed Nov. 7, 1990, Cl. 341/22, ZUASI-STENO KEYBOARD FOR TEXT ENTRY INTO A COMPUTOR, Eric P. Goldwasser, et al., Owner of Record: *Inventors*, Attorney or Agent: Michael de Angeli, Ex. Gp.: 264

4,795,648, Re. S. N. 07/606,109, Filed Oct. 31, 1990, Cl. 426/111, SANDWICH WRAPPER AND METHOD OF WRAPPING, Gilbert Capy, et al., Owner of Record: *Buchberg Partner & Co. S.P., Paris, France*, Attorney or Agent: John Kurucz, Ex. Gp.: 132

4,824,957, Re. S. N. 07/606,222, Filed Oct. 31, 1990, Cl. 548/213, STABILIZATION OF NONAQUEOUS SOLUTIONS OF 3-ISOTHIAZOLONES, David R. Amick, Owner of Record: *Rohm and Haas Co., Philadelphia, Pa.*, Attorney or Agent: Michael B. Fein, Ex. Gp.: 122

4,833,281, Re. S. N. 07/609,952, Filed Nov. 5, 1990, Cl. 300/61.45R, MOTION DETECTOR, David T. Maples, Owner of Record: *Lectron Products, Inc., Rochester Hills, Mich.*, Attorney or Agent: Christopher M. Brock, Ex. Gp.: 214

4,901,025, Re. S. N. 07/608,734, Filed Nov. 5, 1990, Cl. 324/357, FAULT DIAGNOSIS SYSTEM FOR ELECTRONIC DEVICES ON AUTOMOBILES, Shigeaki Hirano, et al, Owner of Record: *Misubishi Denki Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: John P. Bundock, Ex. Gp.: 267

4,902,858, Re. S. N. 07/576,050, Filed Aug. 31, 1990, Cl. 178/19, COORDINATES INPUT APPARATUS, Tsuguya Yamanami, et al., Owner of Record: *Wacom Co., Ltd., Tokyo, Japan*, Attorney or Agent: Allan M. Lowe, Ex. Gp.: 261

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,894,975, Reexam. No. 90/002,190, Requested Nov. 2, 1990, Cl. 053/412, METHOD AND APPARATUS FOR MAKING RECLOSABLE BAGS WITH FASTENER STRIPS IN A FORM FILL AND SEAL MACHINE, Steven Ausnit, Owner of Record: *Minigrip Inc., Orangeburg, N.Y.*, Attorney or Agent: Hill, Van Santen, Steadman & Simpson, Chicago, Ill, Ex. Gp.: 321, Requester: Nikon Tokkyo Co., Ltd., Tokyo, Japan

Department of Commerce
Patent and Trademark Office
37 CFR Part 1
Patent Fees

Agency: Patent and Trademark Office, Commerce
Action: Interim Rule

Summary: The Omnibus Budget Reconciliation Act of 1990 imposes a 69% surcharge on fees charged under 35 U.S.C. § 41(a) and (b). The surcharge took effect on November 5, 1990. By this notice, the Patent and Trademark Office (Office) is informing the public of the patent fees affected and the new amounts including the surcharge.

Effective Date: As required by the Omnibus Budget Reconciliation Act, the fees in this interim rule are effective November 5, 1990. Consideration will be given to comments received on or before January 25, 1991.

Addresses: Address written comments to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, Attention: Frances Michalkewicz, Suite 904, Building 2, Crystal Park. Written comments will be available for public inspection in Suite 904 of Building 2, Crystal Park, at 2121 Crystal Drive, Arlington, Virginia.

For Further Information Contact: Frances Michalkewicz by telephone at (703) 557-1610 or by mail to her attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

Supplementary Information

The Patent and Trademark Office is required by the Omnibus Budget Reconciliation Act of 1990 to apply a 69% surcharge to patent fees charged under 35 U.S.C. § 41(a) and (b). By this Act, the 69% surcharge is rounded by standard arithmetic rules. The Office has applied standard arithmetic rules so that the amounts rounded would be *de minimis* and convenient to the user.

For entities other than small entities, amounts of $100 or more were rounded to the nearest $10. Amounts between $10 and $99 were rounded to the nearest even number so that the comparable small entity fee would be a whole number. For small entities, the Office then reduced the fee by 50% as required by 35 U.S.C. § 41(h).

Any fee under 35 U.S.C. § 41(a) and (b) which is paid on or after November 5, 1990, is subject to the surcharge. For purposes of determining the amount of the fee to be paid, the date of mailing indicated on a proper Certificate of Mailing under 37 CFR § 1.8 or a proper Certificate of Express Mail under 37 CFR § 1.10 will be considered to be the date of receipt in the Office.

Since, by law, this surcharge became effective on November 5, 1990, and the law provided no discretion to the Office, this rule is effective as of that date.

Other Considerations

The rule change is in conformity with the requirements of the Regulatory Fexibility Act (Pub. L. 96-354), Executive Orders 12291 and 12612, and the Paperwork Reduction Act, 44 U.S.C. § 3501 *et seq*. There are no information collection requirements related to patent fee rules.

The Office has determined that this notice has no Federalism implications affecting relations between the National Government and the States as outlined in Executive Order 12612.

The Office has determined that this rule change is not a major rule under Executive Order 12291. The annual effect on the economy will be less than $100 million because the additional revenue that the surcharge collects will be offset by a reduction in the Office's appropriation from the general revenues of the United States. While there will be an increase in patent fees, they are required by law, and the Office is without discretion to reduce them.

The Office has determined that good cause exists for dispensing with the requirements under 5 U.S.C. § 553 of notice and comment and delayed effective date. These procedures are impracticable because the Omnibus Budget Reconciliation Act of 1990 imposed a surcharge on fees set under 35 U.S.C. § 41(a) and (b) effective November 5, 1990. Therefore, this rule is being issued as an interim final rule effective November 5, 1990. Comments received by January 25, 1991 will be considered in drafting the final rule.

Because a notice of proposed rulemaking is not required by 5 U.S.C. § 553(b)(B) or any other law, a Regulatory Flexibility Analysis is not required and has not been prepared for purposes of the Regulatory Flexibility Act.

Lists of Subjects
37 CFR Part 1

Administrative practice and procedure, Courts, Freedom of Information, Inventions and patents, Reporting and recordkeeping requirements, Small businesses.

For the reasons set out in the preamble, 37 CFR is amended as set forth below.

PART 1-RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 continues to read as follows:

Authority: 35 U.S.C. § 6 unless otherwise noted.

2. Section 1.16 is amended by revising the section heading and paragraphs (a)-(d) and (f)-(j) and adding the authority citation to read as follows:

§ 1.16 National application filing fees and surcharge.

(a) Basic fee for filing each application for an original patent, except design or plant cases:
By a small entity (§ 1.9(f)).....$315.00
By other than a small entity.....$630.00

(b) In addition to the basic filing fee in an original application, for filing or later presentation of each independent claim in excess of 3:
By a small entity (§ 1.9(f)).....$30.00
By other than a small entity.....$60.00

(c) In addition to the basic filing fee in an original application, for filing or later presentation of each claim (whether independent or dependent) in excess of 20. (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee calculation purposes):
By a small entity (§ 1.9(f)).....$10.00
By other than a small entity.....$20.00

(d) In addition to the basic filing fee in an original application, if the application contains, or is amended to contain, a multiple dependent claim(s) per application:
By a small entity(§ 1.9(f)).....$100.00
By other than a small entity.....$200.00

(If the additional fees required by paragraphs (b), (c), and (d) are not paid on filing or on later presentation of the claims for which the additional fees are due, they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

* * * * *

(f) For filing each design application:
By a small entity (§ 1.9(f)) $125.00
By other than a small entity $250.00

(g) Basic fee for filing each plant application:
By a small entity (§ 1.9(f)) $210.00
By other than a small entity $420.00

(h) Basic fee for filing each reissue application:
By a small entity (§ 1.9(f)) $315.00
By other than a small entity $630.00

(i) In addition to the basic filing fee in a reissue apllication, for filing or later presentation of each independent claim which is in excess of the number of independent claims in the original patent:
By a small entity(§ 1.9(f)) $30.00
By other than a small entity $60.00

(j) In addition to the basic filing fee in a reissue application, for filing or later presentation of each claim (whether independent or dependent) in excess of 20 and also in excess of the number of claims in the original patent. (Note that § 1.75(c) indicates how multiple dependent claims are considered for fee purposes):
By a small entity (§ 1.9(f)) $10.00
By other than a small entity $20.00

(Note: See § 1.445 for international application filing and processing fees.)

(Omnibus Budget Act of 1980, § 10101; 35 U.S.C. 6, 41)

3. Section 1.17 is amended by revising the section heading, paragraphs (a)-(g), (l), and (m), and the authority citation to read as follows:

§ 1.17 Patent application processing fees and surcharge.

(a) Extension fee for response within first month pursuant to § 1.136(a):
By a small entity(§ 1.9(f)) $50.00
By other than a small entity $100.00

(b) Extension fee for response within second month pursuant to § 1.136(a):
By a small entity(§ 1.9(f)) $150.00
By other than a small entity $300.00

(c) Extension fee for response within third month pursuant to § 1.136(a):
By a small entity(§ 1.9(f)) $365.00
By other than a small entity $730.00

(d) Extension fee for response within fourth month pursuant to § 1.136(a):
By a small entity (§ 1.9(f)) $575.00
By other than a small entity $1,150.00

(e) For filing a notice of appeal from the examiner to the Board of Patent Appeals and Interferences:
By a small entity (§ 1.9(f)) $120.00
By other than a small entity $240.00

(f) In addition to the fee for filing a notice of appeal, for filing a brief in support of an appeal:
By a small entity (§ 1.9(f)) $120.00
By other than a small entity $240.00

(g) For filing a request for an oral hearing before the Board of Patent Appeals and Interferences in an appeal under 35 U.S.C. 134:
By a small entity (§ 1.9(f)) $100.00
By other than a small entity $200.00

* * * * *

(i) For filing a petition
(1) For the revivial of an unavoidably abandonded application under 35 U.S.C. sections 133 or 371, or
(2) For delayed payment of the issue fee under 35 U.S.C. § 151:
By a small entity(§ 1.9(f)) $50.00
By other than a small entity $100.00

(m) For filing a petition
(1) For revival of an umintentionally abandonded application, or
(2) For the unintentionally delayed payment of the fee for issuing a patent:
By a small entity (§ 1.9(f)) $525.00
By other than a small entity $1050.00

(Omnibus Budget Rencociliation Act of 1990), § 10101; Pub. L. 97-247; 15 U.S.C. 1113, 1123, 35 U.S.C. 6, 41, 181-188; Export Administration Act of 1979, as amended; Arms Export Control Act, as amended; Nuclear Non-Proliferation Act of 1978, and the delegations in the regulations under these acts to the Commissioner by regulations (15 CFR 370.10(j); 22 CFR 125.04, and 10 CFR 810.7))

4. Section 1.18 is revised to read as follows:

§ 1.1 Patent issue fees and surcharge.

(a) Issue fee for issuing each original or reissue patent, except a design or plant patent:
By a small entity (§ 1.9(f)) $525.00
By other than a small entity $1,050.00

(b) Issue fee for issuing a design patent:
By a small entity (§1.9(f)) $185.00
By other than a small entity $370.00

(c) Issue fee for issuing a plant patent:
By a small entity(§ 1.9(f)) $260.00
By other than an small entity $520.00

(Omnibus Budget Reconiiation Act of 1990, § 10101; 35 U.S.C. 6, 41)

5. Section 1.20 is amended by revising the section heading, paragraphs (d) and (h)-(j), and the authority citation to read as follows:

§1.20 Post issuance fees and surcharge.

(d) For filing each statutory disclaimer (§ 1.321):
By a small entity(§ 1.9(f)) $50.00
By other than a small entity $100.00

* * * * *

(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after August 27, 1982, in force beyond four years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) $415.00
By other than a small entity $830.00

(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after August 27, 1982, in force beyond eight years; the fee is due by seven years and six months after the original grant:
By a small entity (§ 1.9(f)) $835.00
By other than a small entity $1,670.00

(j) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after August 27, 1982, in force beyond twelve years; the fee is due by eleven years and six months after the original grant:
By a small entity (§ 1.9(f)) $1,250
By other than a small entity $2,500.00

(Omnibus Budget Reconciliation Act of 1990, § 10101, 35 U.S.C. 6, 41; 15 U.S.C. 1113, 1123)

* * * * *

Nov. 20, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks

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Extension of Interim Orders

Agency: Patent and Trademark Office
Action: Extension of existing interim orders issued under section 914 of the Semiconductor Chip Protection Act of 1984 (SCPA), 17 U.S.C. § 914.
Summary: The Assistant Secretary and Commissioner of Patents and Trademarks has determined that the existing interim orders issued under section 914 should be extended.
Date: All extended orders are hereby extended until July 1, 1991.

Address: Address correspondence to Assistant Commissioner for External Affairs, United States Patent and Trademark Office, Washington, D.C. 20231.
For Further Information Contact: Michael K. Kirk, Assistant Commissioner for External Affairs, United States Patent and Trademark Office, Box 4, Washington, D.C. 20231.
Supplementary Information: The Commissioner of Patents and Trademarks has been delegated the task of determining when and under what conditions interim protection in the United States will be extended under section 914 of the SCPA to owners of foreign "mask works," the series of related images representing a three-dimensional pattern in the layers of a semiconductor chip. In international parlance, mask works are also known as "integrated circuit layout designs" or as "topographies." To be eligible for interim mask work protection, it must be established that a foreign government is making good faith efforts and reasonable progress toward establishing a regime of protection substantially similar to that established under the SCPA, and that U.S. mask works are not subject to unauthorized distribution or commercial exploitation in the country concerned.

In November 1987, the Congress extended the President's authority to issue interim orders until July 1, 1991. Pub.L. No. 100-159 (1987). In doing so, Congress expressed its belief that "this process [under section 914] is promoting the protection of U.S. mask works abroad." H. Rpt. 100-388, 100th Cong., 1st Sess. (1987).

Interim orders have been issued extending protection to 19 States. *See* 54 FR 50793 (Dec. 11, 1989).

Discussion and Findings of the Commissioner

Representative Robert W. Kastenmeier, Chairman of the House Judiciary Subcommittee on Courts, Intellectual Property and the Administration of Justice, has stated that the transitional provisions in section 914 were "intended to encourage the rapid development of a new worldwide regime for the protection of semiconductor chips." 133 Cong. Rec. E1283 (daily ed. Apr. 6, 1987). When the SCPA was enacted in 1984, and when the President's authority under seciton 914 was extended in 1987, it was contemplated that the then-draft World Intellectual Property Organization (WIPO) "Treaty on Intellectual Property in Respect of Integrated Circuits" would provide the basis for a multilateral regime of protection for semiconductor chip layout designs. *Id.*

When the interim orders were last extended in Dec. 1989, the Commissioner noted that substantial compromises were reached at the May 1989 diplomatic conference for conclusion of the WIPO treaty. The Commissioner stated that these compromises had produced a treaty with levels of protection below the international norms reflected in the laws of the countries that have enacted chip protection legislation.

Separate negotiations to establish a multilateral standard of chip protection are under way within the framework of the Uruguay Round of multilateral trade negotiations under the General Agreement on Tariffs and Trade (GATT), which is to conclude in Dec. 1990. In negotiations within the Trade Related Aspects of Intellectual Property Rights (TRIPS) sub-group of the Uruguay Round, the United States is seeking to establish a standard providing higher levels of chip protection than those contained in the WIPO treaty.

In the early months of 1991, the Congress must consider whether to extend the President's interim authority under section 914. Congress should take into account the fact that the WIPO treaty does not provide an acceptable multilateral basis for protection for chip layout designs. The results of the TRIPS negotiations, and their implications for the creation of a viable multilateral regime, should also be considered.

The Commissioner set forth his views on extension of section 914 in his July 1990 *Report on the Operation of Section 914 of the Semiconductor Chip Protection Act of 1984* (Report), submitted to Congress in consultation with the Register of Copyrights. The Commissioner stated:

> Our continuing experience in the administration of section 914, when coupled with our negotiations on multilateral agreements designed to promote international comity with respect to the protection of mask works, continue to point out the balanced level of protection set in the SCPA. ...[T]he procedures implemented under section 914 continue to have an important role in the administration of the SCPA and the internationalization of standards for chip protection.

Report at 34.

If Congress decides that extension of section 914 is justified, the duration of such authority must also be considered. In the Report, the Commissioner urged an indefinite extension, stating that "the flexibility of such procedures has helped promote the rapid growth of sound and balanced foreign laws on chip protection that do not create trade problems." *Id.*

In the meantime, the Commissioner has determined that the interim orders for all countries now subject to protection under section 914 should be extended until the expiration of statutory authority to grant such orders; that is, until July 1, 1991. Many of these countries have enacted laws providing protection on a level substantially similar to that of the SCPA, and the Commissioner notes with approval that legislation providing such protection is nearing completion in all other countries subject to section 914 orders.

No evidence has been presented that national, domiciliaries or sovereign authorities of any country subject to interim protection orders are engaged in the misappropriation, unauthorized distribution, or unauthorized commercial exploitation of mask works.

ORDER EXTENDING THE EXPIRATION DATE FOR INTERIM PROTECTION ORDERS ISSUED UNDER CHAPTER 9 OF TITLE 17, UNITED STATES CODE

In accordance with the authority vested in me by Amendment 2 to Department Organization Order 10-14 regarding 17 U.S.C. §914, I find that the Governments of Australia, Austria, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom have made and are making good faith efforts toward providing protection for U.S. mask works. I find further that nationals, domiciliaries and sovereign authorities of those countries, and persons controlled by them, are not engaged in the misappropriation, unauthorized distribution or unauthorized commercial exploitation of mask works. I find further that the extension of the expiration dates for interim orders will promote the purposes of the Semiconductor Chip Protection Act of 1984 and international comity with respect to the protection of mask works.

Accordingly, the existing interim orders for all of the aforementioned countries are extended and shall terminate on July 1, 1991.

Nov. 6, 1990

HARRY F. MANBECK, JR.
Assistant Secretary and Commissioner of Patents and Trademarks

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Errata

"All reference to Patent No. 4,965,791 to Jerry Hutchinson, et al. of Mass. for `NETWORK TOPOLOGY CONTROL METHOD AND APPARATUS' appearing in the Official Gazette of October 23, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,928,691 to Susan C. Nicolson, et al. of New Jersey for `LINGUAL OXIMETER PROBE' appearing in the Official Gazette of May 29, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,962,670 to Michael L. Sanderson et al. of England for `FLUID FLOW METERS' appearing in the Official Gazette of Oct. 16, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,968,133 to Richard Vetter of Calif. for `CIRCULAR PROJECTION AND DISPLAY SYSTEM USING SEGMENTED TRAPEZIODAL SCREENS' appearing in the Official Gazette of Nov. 6, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,970,436 to Peter J. Sacchetti of Framingham, Mass. for `MOTION DETICETING LIGHT CONTROLLER SYSTEM' appearing in the Official Gazette of Nov. 13, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,961,552 to Aneurin G. Bird et al. of Netherlands for `FAST EARTH RECOVERY PROCEDURE' appearing in the Official Gazette of Oct. 9, 1990 should be deleted since no patent was granted."

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

ETT Corp. dba Pasta Factory, Orinda, Calif., Reg. No. 1,341,675, for the mark "THE PASTA FACTORY", Canc. No. 18,977.

Xian Foods Corp., Westmont, Ill., Reg. No. 1,355,661, for the mark "RAINBOW", Canc. No. 18,663.

Richard Albin Drost, dba Naked City, Roselawn, Ind., Reg. No. 962,261, for the mark "COVER GIRLS", Canc. No. 18,972.

Engineering Automation Systems, Inc., Kensington, Conn., Reg. No. 1,243,128, for the mark "OAK", Canc. No. 18,377.

American Professional Marketing, Inc., Oklahoma City, Okla., Reg. No. 1,318,441, for the mark "CANDI BEEZ", Canc. No. 18,597.

Heavenly Helper Toys, Inc., Miami, Fla., Reg. No. 1,461,105, for the mark "CHERUBIES" and design, Canc. No. 18,891.

Louis Marx & Co., Inc., Glen Dale, W. Va., Reg. No. 706,930, for the mark "MARX" and design, Canc. No. 18,968.

JEAN BROWN
Administrator of the
Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for
Trademarks

PATENT NOTICES

Certificates of Correction For Week of December 18, 1990

D. 294,221	4,858,299	4,876,818	4,887,083
PP. 7,076	4,859,229	4,877,542	4,887,278
4,418,209	4,860,367	4,877,547	4,887,297
4,585,796	4,861,212	4,878,201	4,887,715
4,617,184	4,861,361	4,878,204	4,888,307
4,643,987	4,862,410	4,878,729	4,888,533
4,663,263	4,862,673	4,879,009	4,888,584
4,709,228	4,862,780	4,879,364	4,889,980
4,712,393	4,863,645	4,879,948	4,890,613
4,730,769	4,864,625	4,880,044	4,891,392
4,740,386	4,866,552	4,880,400	4,891,891
4,764,507	4,869,344	4,880,914	4,891,993
4,793,988	4,869,806	4,881,571	4,892,475
4,798,823	4,869,971	4,881,584	4,893,221
4,800,884	4,870,078	4,881,810	4,893,738
4,802,295	4,871,265	4,881,906	4,894,048
4,810,537	4,871,368	4,882,099	4,894,705
4,813,473	4,871,461	4,882,389	4,894,757
4,814,587	4,871,736	4,883,009	4,895,057
4,822,734	4,871,744	4,883,020	4,895,236
4,829,974	4,872,011	4,883,093	4,895,379
4,831,036	4,872,997	4,883,552	4,895,542
4,834,026	4,873,280	4,883,677	4,895,736
4,838,767	4,873,342	4,883,830	4,896,098
4,843,647	4,873,419	4,883,859	4,896,872
4,845,569	4,873,547	4,883,985	4,896,980
4,847,054	4,874,274	4,884,004	4,897,354
4,847,177	4,874,399	4,884,245	4,897,456
4,847,300	4,874,621	4,884,306	4,897,764
4,847,784	4,874,771	4,884,489	4,900,332
4,852,973	4,874,941	4,884,915	4,901,936
4,852,993	4,875,021	4,885,075	4,941,623
4,853,331	4,875,332	4,885,345	4,955,012
4,853,784	4,876,325	4,885,347	
4,854,984	4,876,454	4,886,369	
4,855,304	4,876,788	4,886,539	

Disclaimers

Des. 308,209.—*Fred L. Laqua*; *Robert E. Hall*, both of Wichita, Kans. GEAR-PUMP ASSEMBLY FOR LIQUID PRODUCTS. Patent dated May 29, 1990. Disclaimer filed Oct. 3, 1990, by the assignee, Great Plains Industries, Inc.

Hereby enters this disclaimer to the entire term of said patent.

3,875,282.—*Joseph S. Steinreich*, Olympia Fields, Ill. PRODUCTION OF HIGH BULK DENSITY SPRAY DRIED HYDROUS SODIUM SILICATE. Patent dated Apr. 1, 1975. Disclaimer filed July 16, 1990, by the assignee, Unilever Patent Holdings BV.

Hereby enters this disclaimer to the entire term of said patent.

4,882,421.—*Kuslima Shogen*, Somerset; *Stanislaw M. Mikulski*, Essex Fells; *Wojciech J. Ardelt*, Passiac, all of N.J. PHARMACEUTICAL FOR TREATING TUMORS AND METHOD FOR MAKING IT. Patent dated Nov. 21, 1989. Disclaimer filed July 27, 1990, by the assignee, Alfacell Corp.

Hereby enters this disclaimer to claims 1, 3 and 4 of said patent.

Disclaimer and Dedication

4,336,455.—*Jack Byrant*, Buckinghamshire, England. SMOKE DETECTORS. Patent dated June 22, 1982. Disclaimer and Dedication filed Aug. 19, 1987, by the assignee, Amersham International, Ltd.

Hereby disclaims and dedicates to the Public the entire term of said patent.

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Patents ..... Numbers 3,769,634 to 3,775,773 inclusive
Plant Patents ..... 3,404 to 3,412 inclusive

REEXAMINATIONS

DECEMBER 18, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,921,346 (1394th)

FIRE RETARDANT SHAFT WALL

Gale E. Sauer, and Carl R. Mapes, both of Kenmore, N.Y.

Reexamination Request No. 90/001,887, Nov. 13, 1989.
Reexamination Certificate for Patent No. 3,921,346, issued Nov. 25, 1975, Ser. No. 325,658, Jan. 22, 1973.
Division of Ser. No. 198,483, Nov. 12, 1971, Pat. No. 3,740,912, which is a continuation of Ser. No. 34,656, May 5, 1970, abandoned.

Int. Cl.[5] E04B 2/28, 2/80

U.S. Cl. 52—30

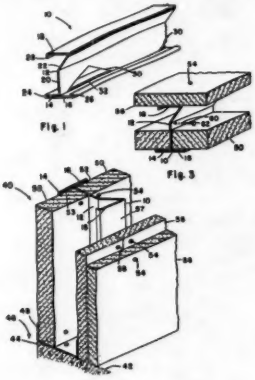


Fig. 1

Fig. 3

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–14 is confirmed.

1. An air shaft cavity wall in a building generally surrounding a vertical air shaft extending continuously through at least two stories and subjected to destructive wind loading, the wall comprising at least one floor and adjacent ceiling cut away to define the continuous shaft therethrough, a plurality of liner panel members, a plurality of studs engaging the liner members, at least one partition member spaced away from the liner members by the studs so as to form an air gap between the partition member and a corresponding one of the liner members, means for mounting the stud in a vertical disposition, said stud-mounting means comprising a floor runner attached to said floor, and means permitting said liner members and the studs to be inserted within the runner from only the side of the wall opposite to the shaft side.

REISSUES

DECEMBER 18, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

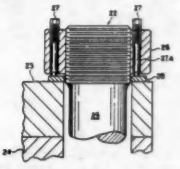
Re. 33,490
APPARATUS TO MECHANICALLY STRESS A BOLT-TYPE FASTENER

Rolf H. Steinbock, 128 Grienbrier Dr., Carnegie, Pa. 15106

Original No. 4,622,730, dated Nov. 18, 1986, Ser. No. 704,967, Feb. 27, 1985. Continuation-in-part of Ser. No. 595,402, Mar. 30, 1984, abandoned. Application for reissue Nov. 16, 1988, Ser. No. 272,719

Int. Cl.[5] **F16D** *1/00, 35/00;* **B21B** *13/02*

U.S. Cl. 29—116.2 **22 Claims**



1. A fastener apparatus to compress a support member against a first member, said apparatus including an elongated shank part extending from said first member and passed freely through an enlarged opening in said support member, an anchor flange connected to one end portion of said elongated shank part for support by said first member, a stress generating flange connected to an opposite end portion of said elongated shank part for exerting a compressive force on said support member, said stress generating flange having a plurality of holes at spaced-apart locations about an outer peripheral part thereof to overlie said support member, and a plurality of jack bolts threadedly engaged with said holes to separately receive a torque, the jack bolts having end parts extending from said holes to stress said elongated shank part extending between said anchor flange and said stress generating flange through torquing said jack bolts for applying a compressive reaction force between said support member and said first member.

Re. 33,491
AGRICULTURAL BAG LOADING MACHINE

William C. Johnson, Omaha, Nebr.; Ronald W. Marpoe, Aberdeen, Md., and Larry B. Cox, Colleyville, Tex., assignors to Rand Farm Systems Inc., Adrian, Mo. and Poly Farms, Inc., Grapevine, Tex.

Original No. 4,653,553, dated Mar. 31, 1987, Ser. No. 912,157, Sep. 24, 1986. Continuation of Ser. No. 767,073, Aug. 19, 1985, abandoned, which is a continuation of Ser. No. 594,323, Mar. 28, 1984, abandoned. Application for reissue Oct. 31, 1988, Ser. No. 264,626

Int. Cl.[5] **B65B** *1/10;* **B65G** *3/04;* **A01F** *25/16*

U.S. Cl. 141—114 **15 Claims**

11. An apparatus for compactly loading a chopped vegetable animal feed into a flexible, elongated agricultural feed bag comprising:

a feed material introductory chamber;

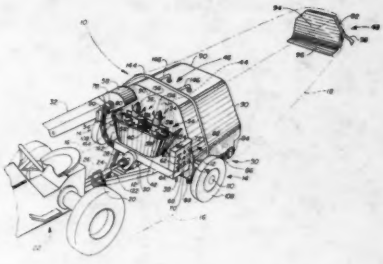
conveyange means adjacent said feed material introductory chamber for conveying vegetable animal feed from said introductory chamber;

an open-ended chamber for receiving feed material from said introductory chamber after passage through said conveyance means, said processing chamber including:

an enclosement hood; and

a retractable floor assembly; and

means mounted on said enclosement hood for retaining a folded, flexible agricultural feed bag in a position in which a portion of said agricultural feed bag surrounds a part of said processing chamber, and for dispensing said bag from the



folds thereof away from said processing chamber as feed enters said bag from the open end of said processing chamber.

Re. 33,492
APPARATUS FOR COOLING AND GRANULATION OF THERMOPLASTIC STRANDS

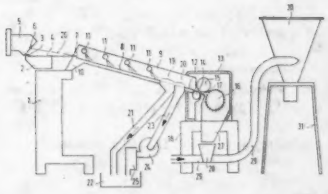
Friedrich Hunke, Grossostheim, Fed. Rep. of Germany, assignor to Automatik Apparate-Maschinenbau GmbH, Fed. Rep. of Germany

Original No. 4,632,752, dated Dec. 30, 1986, Ser. No. 657,207, Oct. 3, 1984. Application for reissue Aug. 14, 1989, Ser. No. 393,562

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1983, 3336032

Int. Cl.[5] **B01D** *35/28;* **B29C** *47/88*

U.S. Cl. 210—173 **17 Claims**



1. A device for cooling and granulating molten thermo-plastic strands which emerge from nozzles, and for producing dried granulate, which comprises

a slanted drainage trough having an upper end disposed below the nozzles;

a granulator disposed beyond the lower end of said drainage trough for receiving said strands from said trough; and

means for providing a flow of coolant on said trough; and about said strands emerging from said nozzles moving on said trough;

said drainage trough having before its lower end in the drainage direction, two successive portions with means allowing the unimpeded drainage of said coolant, with said first portion connected to a drain and the second portion having means for providing an air stream in a gravitational direction through said trough.

Re. 33,493

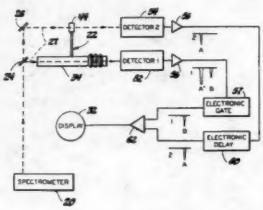
METHOD AND APPARATUS FOR MEASURING STABLE ISOTOPES

Peter S. Lee, Troy; Richard F. Majkowski, Southfield, and Dale L. Partin, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Original No. 4,684,805, dated Aug. 4, 1987, Ser. No. 767,742, Aug. 21, 1985. Application for reissue May 2, 1988, Ser. No. 189,495

Int. Cl.[5] G01J *3/42*

U.S. Cl. 250—343 **23 Claims**



5. Apparatus for measuring isotope enrichment in different concentrations of stable in a gaseous sample comprising;

a tunable source of monochromatic radiation for scanning the frequency through a band,

a sample cell arrangement having at least two optical paths through the same sample, the paths having different lengths in a ratio generally corresponding to the inverse ratio of a isotope concentrations,

means for transmitting radiation from the source through the paths,

detector means for measuring the spectral line intensity of an isotope in each path, and

means for adjusting the relative path lengths by measured amounts to equalize the measured line intensities, so that the amount of adjustment for a sample gas relative to a reference gas is a measure of isotope enrichment.

Re. 33,494

PICK HOLDING ARRANGEMENTS

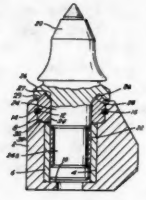
Leslie W. Hindmarsh; Robert G. Knight, and Gerald J. Sanders, all of Nuneaton, United Kingdom, assignors to Santrade Ltd., Lucerne, Switzerland

Original No. 4,603,911, dated Aug. 5, 1986, Ser. No. 587,224, Mar. 7, 1984. Application for reissue Apr. 19, 1988, Ser. No. 184,960

Claims priority, application United Kingdom, Mar. 10, 1983, 8306641

Int. Cl.[5] E21C *35/18*

U.S. Cl. 299—91 **10 Claims**



9. A cutting pick assembly comprising:

a point attack bit including a front cutting face, a rearwardly projecting cylindrical shank, and a shoulder disposed between said cutting face and said shank, said shoulder including a rearwardly open, forwardly tapering recess defined by first and second forwardly converging frusto-conical surfaces,

a pick box containing a forwardly open bore defining a front-to-rear extending longitudinal axis for receiving said shank axially therein, one of said frusto-conical surfaces extending from a forward end of said cylindrical shank,

means retaining said shank in said bore and permitting rotation of said pick about said axis,

said pick box carrying a face surrounding a front end of said bore, said face defined by a first frusto-conical portion extending radially outwardly and axially forwardly, and a second frusto-conical portion extending radially inwardly and axially forwardly, said first and second frusto-conical portions converging forwardly in V-shape to engage said first and second frusto-conical surfaces of said recess in said bit, to impede the passage of foreign matter into said bore.

Re. 33,495

STEREOSELECTIVE PREPARATION OF 3-SUBSTITUTED-4-ANILINO-PIPERIDINE COMPOUNDS AND DERIVATIVES

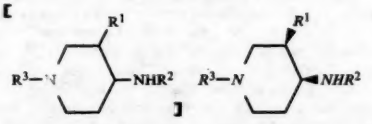
Linas V. Kudzma, North Bergen; H. Kenneth Spencer, Chatham, and Sherry A. Savernak, Plainfield, all of N.J., assignors to BOC, Inc., Murray Hill, N.J.

Original No. 4,849,521, dated Jul. 18, 1989, Ser. No. 115,276, Nov. 2, 1987. Application for reissue Sep. 27, 1989, Ser. No. 413,427

Int. Cl.[5] C07D *417/06*

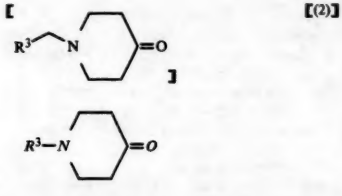
U.S. Cl. 546—209 **17 Claims**

14. A method for preparing a *cis* compound of the formula:



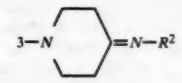
wherein R^1 is a lower alkyl, lower [cylic] *cyclic* alkyl, lower [alkyl lower cylic alkyl,] *cyclic alkyl* lower alkyl, lower alkenyl, or *phenyl* lower alkyl [phenyl]; R^2 is a phenyl, which may be substituted with one or more substituents selected from the group consisting of lower alkoxy, lower alkyl, halogen or combinations thereof, and R^3 is selected from the group consisting of phenyl-lower-alkyl, thiazoyl lower alkyl which can be substituted in the 4-position with a lower alkyl group, (4,5-dihydro-4-oxo-1H-tetrazol-1-yl) lower alkyl which can be substituted in the 4-position with a lower alkyl, and substituted phenyl lower alkyl in which the substituents on the phenyl ring are selected from halogen, lower alkoxy, lower alkyl, halogen or combinations thereof; said method comprising:

(i) reacting H_2NR^2 with a compound of the following formula:



[(2)]

to form an imine compound of the formula



(ii) deprotonating the compound [of formula (2)] with a non-nucleophilic base to form a deprotonated anion at the 3-position of the piperidine ring;

(iii) reacting said anion with a substituting agent to introduce an R^1 group in said 3-position; and

(iv) reducing the compound of step [(ii)] (*iii*) to produce the *cis* compound [(1)] above, thereby obtaining the cis isomer thereof, whereby a cis:trans selectivity of greater than about 90 percent is obtainable.

Re. 33,496

THERMAL TRANSFER RECORDING APPARATUS

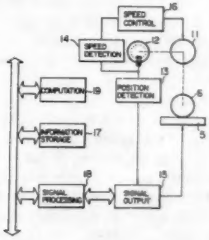
Jyunichi Matsuno, Toride; Masataka Kawauchi, Ishioka; Masashi Yoshida, Nakaminato, and Satoshi Kawamura, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,605,938, dated Aug. 12, 1986, Ser. No. 726,365, Apr. 23, 1985. Application for reissue Aug. 12, 1988, Ser. No. 232,110

Claims priority, application Japan, Apr. 27, 1984, 59-83716

Int. Cl.[5] G01D *15/00*

U.S. Cl. 346—76 PH **22 Claims**



1. A recording apparatus of thermal transfer type comprising:

a carrier supporting a coating of a thermally transferable recording material and movable along a predetermined path;

a platen roller rotatably mounted for supporting and transporting a recording medium and disposed so that said supported recording medium faces said carrier moving through said predetermined path;

a thermal head having a plurality of linearly arrayed heat generating elements for being urged against said platen roller in a recording mode and selectively energizable, thereby producing a thermal energy adapted to transfer the recording material corresponding to the energized heat generating elements onto the recording medium supported by said platen roller:

driving means for continuously driving said platen roller;

rotation detecting means for detecting a rotation speed of said platen roller,

position detecting means for detecting an angular position in rotation of said platen roller;

means for producing a character and pattern signal in accordance with the rotational speed of said platen roller and a desired density tone of the record produced on said recording medium so that the thermal energy produced by the energized heat generating elements is at a level suitable to obtain the desired density tone of the record, and

means for controlling the density tone in response to an output signal of said position detecting means while said platen roller is continuously driven so as to selectively energize said heat generating elements according to said character and pattern signal, thereby producing on said recording medium a record of dots with the desired density tone corresponding to said character and pattern signal.

Re. 33,497

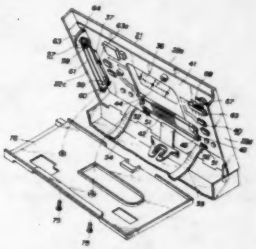
PORTABLE TAPE PLAYER WITH RADIO IN LID

Hideo Honma, Chiba, and Nobuyuki Sato, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Original No. 4,651,312, dated Mar. 17, 1987, Ser. No. 643,488, Aug. 23, 1984. Application for reissue Mar. 17, 1989, Ser. No. 324,905

Int. Cl.[5] H04B *1/08*; **G11B** *31/00, 33/06*

U.S. Cl. 369—10 **13 Claims**



1. A combination portable cassette tape player and built-in radio receive, comprising:

a main body in the form of a rectangular parallelepiped;

means for arranging a cassette tape player within said main body;

a cover element hingedly attached to said main body having a height substantially less than a height of said main body and cooperating with said main body and said tape player to form a cassette tape holding section for receiving a cassette tape therein; and

means for arranging a radio receiver within said cover element, said radio receiver including a printed circuit board having a [substantially centrally arranged] cut-out [portion] *portion* and an antenna element and further comprising means for mounting said antenna element substantially within said [centrally arranged] cut-out portion that is mounted within said cover element.

Re. 33,498

METHOD AND STRUCTURE FOR PROPERLY ALIGNING FORMS IN A PRINTER

Thomas A. Proulx, Palo Alto, and Thomas H. A. LeFevre, San Jose, both of Calif., assignors to Intuit, Palo Alto, Calif.

Original No. 4,725,156, dated Feb. 16, 1988, Ser. No. 684,652, Dec. 21, 1984. Application for reissue Jun. 21, 1989, Ser. No. 369,391

Int. Cl.[5] B41J *13/26*

U.S. Cl. 400—630 **24 Claims**

21. A method for aligning a preprinted form with a print position of a printer in a computerized printing system comprising:

inserting the form into the printer;

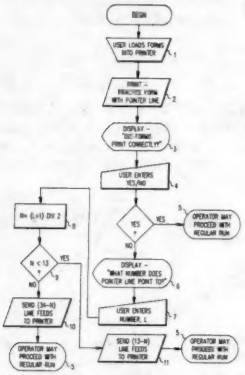
causing the printer to print an alignment mark on the form at a location of the form corresponding to the print position of the printer;

having a computer operator look at the location where the alignment mark was printed;

having the computer operator supply information indicating to the computerized system the location at which the alignment mark was observed; and

causing the computerized system to determine automatically,

based on the information supplied by the computer operator, an amount of form movement needed to bring a preselected



portion of the form into alignment with the print position of the printer when there is an alignment error.

Re. 33,499

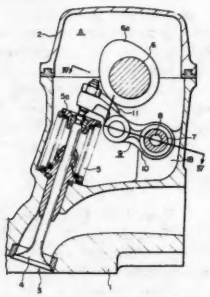
METHOD AND APPARATUS FOR THE CONTROL OF VALVE OPERATIONS IN INTERNAL COMBUSTION ENGINE

Yoshikatsu Nakano, Kawagoe, and Masaaki Matsuura, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Original No. 4,545,342, dated Oct. 8, 1985, Ser. No. 596,752, Apr. 4, 1984. Application for reissue Oct. 8, 1987, Ser. No. 107,394

Int. Cl.[5] F02B *77/00*

U.S. Cl. 123—198 F **12 Claims**



7. A method of operating the valves of an internal combustion engine having a plurality of cylinders and a plurality of intake valves and a plurality of exhaust valves for each cylinder of said engine, comprising the steps of:

for a low speed rotation of said engine, placing a part of each of said intake valves and said exhaust valves in a first mode of operation and another part of each of said intake valves and said exhaust valves in a second mode of operation different from the first mode of operation, the first mode of operation allowing both the intake and exhaust of more gases through the intake valves and exhaust valves, respectively, than the second mode of operation;

for medium speed rotation of said engine, placing all said intake valves in the said first mode of operation and part of said exhaust valves in the first mode of operation and part of said exhaust valves in the second mode of operation; and

for high speed rotation of said engine, placing all said intake valves and exhaust valves in the first mode of operation.

Re. 33,500

ELECTRONIC DIGITIZED PROPORTIONAL-INTEGRAL CONTROLLER

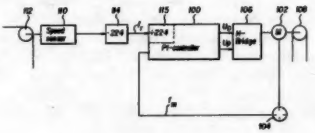
Wilhelmus T. L. Bisseling, Meerlo, Netherlands, assignor to Oce-Nederland B.V., Venlo, Netherlands

Original No. 4,733,144, dated Mar. 22, 1988, Ser. No. 30,589, Mar. 27, 1987. Application for reissue Jul. 1, 1988, Ser. No. 214,415

Claims priority, application European Pat. Off., Apr. 1, 1986, 86104381.8

Int. Cl.[5] G05B *19/28*

U.S. Cl. 388—809 **16 Claims**



1. An electronic proportional-integral controller for controlling the speed of an electric motor in accordance with a reference signal whose frequency represents the desired output speed of the controlled electric motor and a speed signal whose frequency represents the actual output speed of the controlled electric motor, comprising:

(a) a proportional circuit for generating a P-control signal corresponding to the difference between the frequencies of the reference signal and the speed signal and wherein the proportional circuit comprises a logic circuit connected to an up/down counter such that the logic circuit:

(1) converts the speed signal into a standardized speed signal which changes its state on each rising flank of the speed signal;

(2) converts the reference signal into a standardized reference signal which changes its state on each rising flank of the reference signal;

(3) delivers a sequence of upward counting pulses to the counter in synchronism with a first clock signal when there is present a pulse of the standardized speed signal and no pulse of the standardized reference signal;

(4) delivers a sequence of downward counting pulses to the counter in synchronism with the first clock signal when there is present a pulse of the standardized reference signal and no pulse of the standardized speed signal;

(5) generates a read signal to output the value of the counter which is the P-control signal; and

(6) generates a reset signal to reset the counter if a pulse has occurred in both the standardized speed signal and in the standardized reference signal and both standardized signals simultaneously have a pulse break;

(b) an integrator circuit which uses the speed signal and the reference signal for generating an I-control signal corresponding to the time integral of the difference between the frequencies of the reference signal and the speed signal;

(c) an addition circuit connected to both the proportional circuit and the integrator circuit for generating a sum signal corresponding to the sum or the weighted sum of the P-control and I-control signals; and

(d) an output stage for controlling the motor in accordance with the sum signal of the addition circuit.

PLANT PATENTS

GRANTED DECEMBER 18, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,396

APPLE TREE TRECO SPUR RED GALA NO. 42

Calvin L. Cooper, Brewster, Wash., assignor to Oregon Rootstock, Inc., Woodburn, Oreg.

Filed Jul. 3, 1989, Ser. No. 375,051

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—34 **1 Claim**

1. The new and distinct variety of apple tree Treco Spur Red Gala No. 42 (Cooper cultivar) substantially as shown and described and characterized by:

spur growth habit of tree;
compact tree size resulting from spur growth habit;
large fruit size; and,
early and extensive red coloration while maintaining a distinctly striped color pattern.

7,397

ASTER PLANT NAMED WHITE BUTTERFLY

Zelimir K. Tvrtkovic-Sahin, Barnsteenstraat 24, 2403 BZ Alphen aan den Rijn, and Petrus J. Akerboom, Paradijsweg 61, 2461 TL Ter Aar, both of Netherlands

Filed Jul. 11, 1989, Ser. No. 378,178

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct Aster plant named White Butterfly, as described and illustrated.

7,398

BEGONIA CULTIVAR MANDERIJN

Jan Man, Amstelveen, Netherlands, assignor to Gebr. Man C.V., Aalsmeer, Netherlands

Filed Mar. 27, 1989, Ser. No. 329,119

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A Begonia plant named Manderijn, as described and illustrated, having orange-salmon, double, sterile flowers up to 5 cm. in diameter; medium size dark green foliage; vigorous and upright growing; self-branching; year round flowering; and the ability to maintain good quality flowers for long periods of time.

7,399

ASTER PLANT NAMED BLUE BUTTERFLY

Zelimir K. Tvrtkovic-Sahin, Barnsteenstraat 24, 2403 BZ, Alphen aan den Rijn, and Petrus J. Akerboom, Paradijsweg 61, 2461 TL, Ter Aar, both of Netherlands

Filed Jul. 11, 1989, Ser. No. 378,180

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct Aster plant named Blue Butterfly, as described and illustrated.

7,400

ASTER PLANT NAMED ROSE BUTTERFLY

Zelimir K. Tvrtkovic-Sahin, Barnsteenstraat 24, 2403 BZ, Alphen aan den Rijn, and Petrus J. Akerboom, Paradijsweg 61, 2461 TL, Ter Aar, both of Netherlands

Filed Jul. 11, 1989, Ser. No. 378,305

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct Aster plant named Rose Butterfly, as described and illustrated.

7,401

ASTER PLANT NAMED PINK BUTTERFLY

Zelimir K. Tvrtkovic-Sahin, Barnsteenstraat 24,, 2403 BZ Alphen aan den Rijn, and Petrus J. Akerboom, Paradijsweg 61, 2461 TL, Ter Aar, both of Netherlands

Filed Jul. 11, 1989, Ser. No. 378,179

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct Aster plant named Pink Butterfly, as described and illustrated.

PATENTS

GRANTED DEC. 18, 1990

ERRATA

For CLASS	See PATENT NO.
452-195	4,977,644
424-389	4,977,662
451-380	4,977,712
452-602	4,977,730
452-747	4,977,731
460-444	4,977,760
251-205	4,977,919
270-226	4,977,974
222-001	4,978,029
135-020	4,978,110
273-026	4,978,121
166-055	4,978,260
411-089	4,978,270
416-089	4,978,286
600-012	4,978,323
429-218	4,978,600
429-245	4,978,601
435-007	4,978,632
392-400	4,978,832
392-449	4,978,833

PATENTS

GRANTED DECEMBER 18, 1990

GENERAL AND MECHANICAL

4,977,621

GENERAL UTILITY HAND-GRIP ASSIST PAD

J. Robert Richard, 11389 Ironwood Rd., San Diego, Calif. 92131, assignor to J. Robert Richard, San Diego, Calif.

Filed Oct. 27, 1989, Ser. No. 427,580
Int. Cl.[5] A41D 13/08
U.S. Cl. 2—20 2 Claims

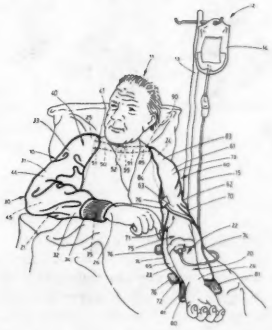
1. An apparatus providing both cushioning to the palm and improved gripping when worn on a user's hand, comprised of a pad made from a material formed by a simple die-cut procedure, and adapted for passive retention to the hand by simple insertion of the fingers through four equally spaced holes, the apparatus is manufactured from elastic material of sufficient thickness and resiliency whereby straightening of said fingers enables the pad to extend outward substantially perpendicular to the surface of the open palm of the user regardless of the attitude disposition of the hand, thus allowing for the evaporation of perspiration, the apparatus shall have a permanently bonded layer of nylon fabric on at least one of the sides of said pad serving to reinforce the mechanical integrity of the pad and providing a low coefficient of friction between the pad and the palm, thus eliminating the possibility of blisters forming on the palm during extended periods of use.

4,977,622

MEDICAL GARMENT

Marlene J. Schley, 9203 West Wisconsin Ave., Milwaukee, Wis. 53226

Filed Jul. 25, 1989, Ser. No. 385,216
Int. Cl.[5] A41D 13/00, 27/10
U.S. Cl. 2—59 17 Claims



1. A medical garment for shielding and insulating the arms and shoulders of a person and operable to permit selective access to one of the arms of the person thereby permitting ongoing medical treatment without requiring removal of the medical garment comprising:

a first sleeve having a continuous and flexible main body which is adapted to shield and insulate one of the patient's arms and associated shoulder;

a second sleeve having a flexible, discontinuous main body which shields and insulates the patient's other arm and associated shoulder and which is adapted to be selectively opened and closed thereby permitting access to the inside portion of the patient's other arm and thus allowing medical treatment at a predetermined site;

means mounted on said respective sleeves for releasably joining said first and second sleeves together in predetermined spaced relation; and

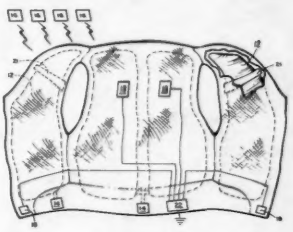
means mounted on said second sleeve for releasably closing the second sleeve thereby inhibiting access to the inside portion of the patient's other arm but permitting limited access to the site of the medical treatment.

4,977,623

USER WEARABLE INFLATABLE GARMENT

Vincent J. DeMarco, 3802 Canon St., San Diego, Calif. 92020

Filed May 1, 1989, Ser. No. 345,287
Int. Cl.[5] A41D 13/00
U.S. Cl. 2—69 13 Claims



1. A garment for personal crash impact protection comprising:

said garment designed to enclose at least the upper torso of a person, said garment is non-restraining to the normal routine of the wearer;

a plurality of first crash sensors located in a fixed position remote from the garment;

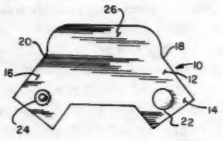
a plurality of second crash sensors located in close relationship to the garment;

each of said plurality of first and second crash sensors provide a separate coded output signal when a predetermined threshold level of deceleration is sensed;

at least one inflatable air bag located in said garment which when inflated substantially encompass the torso of the wearer adjacent thereto; and

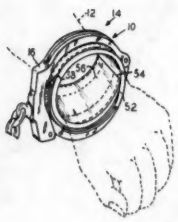
inflation means connected to receive said output signals from said plurality of first and second crash sensors for inflating said at least one inflatable air bag when a preselected number of signals are simultaneously received from a selected number of said plurality of first and second crash sensors.

4,977,624
TIE KNOT
Carl A. Safford, 2353 Southern Hills, Mexico, Mo. 65265
Filed Dec. 8, 1988, Ser. No. 281,221
Int. Cl.[5] A41D *25/02*
U.S. Cl. 2—152 R 8 Claims



1. A single tie knot element comprising a tie knot body portion made of a material sufficiently firm to keep a tie knot shape and sufficiently flexible to allow it to open and close around the tie; an upper head portion integral with said body portion, said head portion having a linear top edge; a pair of laterally spaced concave arcuate curved portions joining said head portion to said body portion; and laterally space extensions extending down from said body portion, each extension containing fastening means for holding said extensions together in assembled position and holding said tie knot in engagement with a shirt collar.

4,977,625
UNDER-CUFF PROTECTIVE DEVICE
Werrett W. Charters, III, 4610 Herman St., Eugene, Oreg. 97404
Filed Apr. 30, 1990, Ser. No. 516,555
Int. Cl.[5] A41D *20/00*
U.S. Cl. 2—170 7 Claims



1. A protective device, in combination with restraining devices applied to limbs of the body, such as handcuffs, legcuffs and the like, comprising:

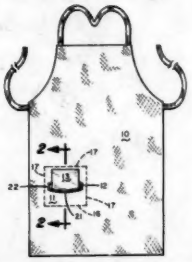
a. a flexible base member having a substantially limb-encircling length, a width, an inside surface, and an outside surface;

b. two wall members, attached in longitudinally parallel spaced relationship upon the outside surface of the base member, the spacing permitting the restraining device to fit between the wall members and snugly against the outside of the base member, said wall member formed to retain said snugly fitted restraining member between the wall members;

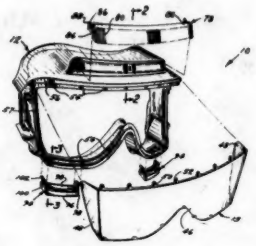
c. means for fastening the base member about a limb.

4,977,626
GARMENT POCKET DISPENSER
Dawn M. Smith, 10213 - 34th St. West, Minnetonka, Minn. 55343
Filed Jan. 17, 1989, Ser. No. 296,971
Int. Cl.[5] A41D *27/20*; B65D *69/00*; A47K *10/24*
U.S. Cl. 2—250 15 Claims

6. A garment or the like having a dispenser pocket located thereon, the dispenser pocket comprising a central, horizontal, elongate and elliptical opening on and extending through said garment; a pocket overlay located on the inner surface of said garment and disposed about the elongate opening, the pocket overlay attached to said garment along a first peripheral edge, and said garment and pocket overlay further having detachable retaining means disposed along the remaining edges of said pocket overlay cooperating with mating retaining means attached to said garment, retaining the pocket overlay proximate to said garment, and forming an openable compartment between said garment and said pocket overlay with the elongate opening extending into the compartment; whereby, a multiplicity of folded sheets maybe placed in the compartment by separating the retaining means and placing the multiplicity of sheets into the compartment while extending a first sheet through the elongate opening of the outer panel allowing ready access to the first sheet.



4,977,627
PROTECTIVE GOGGLE
Richard T. Metcalfe, and Arthur J. Salce, both of Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.
Filed Oct. 18, 1988, Ser. No. 259,171
Int. Cl.[5] A61F *9/02*
U.S. Cl. 2—437 42 Claims



housing, said upper ventilation section comprising an array of upper openings for providing direct ventilation; and

at least one lower ventilation section on said lower surface of said housing, said lower ventilation section comprising an array of lower openings for providing direct ventilation;

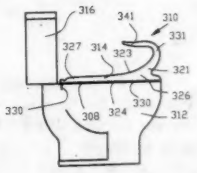
wherein said array of upper and lower openings define a plurality of adjacent and aligned columns and rows of openings formed by a plurality of spaced first wall members and at least one second wall member transverse to said first wall members, said first and second wall members defining said upper or lower openings, at least some of said first wall members having heights which differ from said second wall member.

4,977,628

WATER CLOSET ARM ASSEMBLY

John P. Barrett, 879 Harbor Island, Clearwater, Fla. 33518

Filed Aug. 17, 1989, Ser. No. 395,269
Int. Cl.[5] A47K *13/02*
U.S. Cl. 4—237 **5 Claims**



5. An improved water closet seat and arm assembly for a water closet having water closet aperture means and a water closet tank, comprising in combination:

a water closet seat having seat pivot means for engaging with the water closet aperture means to secure said water closet seat to the water closet;

said water closet seat defining a front portion and a back portion with said front portion occupying a front one-third of said water closet seat and with said back portion occupying a back two-third of said water closet seat;

a first and a second arm integrally formed with said water closet seat and extending from a first and a second base of said front portion of said water closet seat and having a first and a second hand gripping means, respectively;

each of said first and second arms extending laterally outwardly from said first and second base of said water closet seat by a first bend for separating said first and second hand-gripping portions by a distance sufficient for enabling said first and second arms to extend outside of the water closet tank when said water closet seat is moved into said raised position;

each of said first and second arms extending upwardly in a forward direction from said first and second bases of said water closet seat by a second bend; each of said first and second arms extending upwardly in a backward direction from said second bend by a third bend to position said first and second hand-gripping portions above said first and second bases of said water closet seat a distance commensurate with a thickness of the water closet tank to enable said water closet seat to be moved and retained in said elevated position;

each of said first and second arms extending only within said front portion of said water closet seat for enabling said first and second hand gripping means to assist a user in lowering and raising the user relative to the water closet seat; and

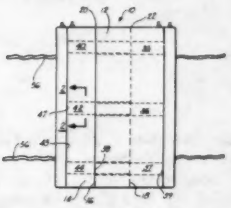
said first and second arms enabling the user to perform normal toilet functions adjacent said back portion of said water closet seat while seated thereon without interference from said first and second arms disposed in said front portion of said water closet seat.

4,977,629

PORTABLE INFLATABLE PATIENT ASSIST APPARATUS

Betty J. Jones, Rte. 1 Box 394, Crestview, Fla. 32536

Continuation of Ser. No. 168,157, Mar. 15, 1988, abandoned. This application Feb. 12, 1990, Ser. No. 478,473
Int. Cl.[5] A61G *7/04*
U.S. Cl. 5—61 **2 Claims**



1. An appaaratus for lifting the rump of a bedridden person to a height above a bed in order to position a bed pan beneath the rump of the person, the apparatus comprising:

(a) a first leg portion extending substantially along a first side perimeter border of a bed a distance between the head and the rump of the individual;

(b) a second leg portion resting upon a second side perimeter border of the bed, also extending the distance between the head of the rump and the bed-ridden person, the first and second leg portions in parallel relationship;

(c) an arcuate inflatable portion joined to the first and second leg portions at the rump area of the bed-ridden patient, the arcuate positioned beneath the rump of the bed-riddened person, and defining a semi-circular space between the leg portions parallel for placement of a bed pan therebeneath when the arcuate portion is inflated;

(d) means for inflating the parallel leg portions, the inflated leg portions defining a border on either side of the patient's upper torso, and the arcuate portion further defining means for raising the rump of the bedridden person to a height sufficient to slip a bed pan beneath the rump of the patient; and

(e) a pair of parallel inflatable portions together spanning substantially the width of the bed, and positioned beneath the first and second leg portions and the arcuate inflatable portion and lying along the length of the bed, so that as one of the parallel inflatable portions is inflated, that patient is raised and rotated as the inflatable portion is inflated.

4,977,630

PATIENT MOVER

James A. Oswalt, and Brenda K. Oswalt, both of 23202 Petrich La., Tomball, Tex. 77375

Filed Jun. 25, 1987, Ser. No. 66,266
Int. Cl.[5] A61G *7/08*
U.S. Cl. 5—81 R **13 Claims**

1. A patient mover for carrying a small child or infant which patient mover can be affixed to a stretcher on an ambulance comprising

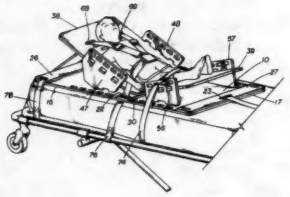
a flat rectangular base;

a flat, flexible, and rectangular child support means;

fastener means for fastening the longitudinal middle of the child support means to the longitudinal middle of the base so that each end of the child support means is flexible and can be raised above the base;

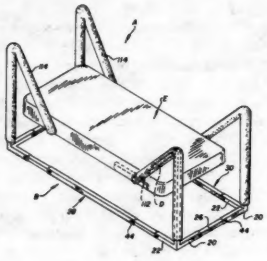
a plurality of side panels hingedly mounted to the child

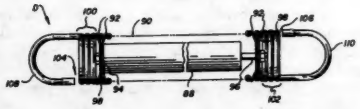
support means, each of said side panels being movable from a collapsed position wherein the side panel is horizontal to the attached child support means and does not engage the base to a support position wherein each of the



side panels is vertical to the attached child support means and does engage the base so as to provide support for the child support means when it is in the raised position; and means for affixing the base to the stretcher.

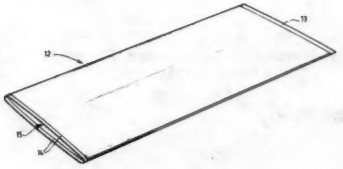
4,977,631
TRUCKER'S BED
Franklin E. Bretz, P.O. Box 371361, El Paso, Tex. 79936
Filed Feb. 13, 1989, Ser. No. 309,225
Int. Cl.[5] A47C *17/64;* B60P *3/38*
U.S. Cl. 5—118 **14 Claims**





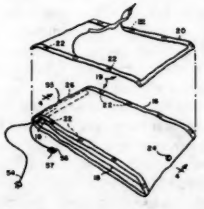
1. A device for suspending a bed, comprising:
(a) a generally elongated frame means including a generally flat support surface for placing the bed thereon;
(b) a plurality of combination spring and shock absorbing means connected to said frame means;
(c) means for securing said spring and shock absorbing means to a support means;
(d) at least one of said spring and shock absorbing means connected to said frame means by a length of a plurality of chain links extending therebetween;
(e) at least one of said spring and shock absorbing means including a shock absorber loaded extension spring;
(f) said shock absorber being positioned within said extension spring in a manner that at least one end thereof is mounted short of the corresponding end of said extension spring; and
(g) said at least one end of said shock absorber being mounted about three coils short of the corresponding end of said extension spring.

4,977,632
LOW-COST SLEEPING BAG
Alex Ong, Victoria, Australia, assignor to Visy Board Properties Pty. Ltd., Kew, Australia
Filed Dec. 11, 1989, Ser. No. 448,355
Claims priority, application Australia, Oct. 16, 1989, PJ6887
Int. Cl.[5] A47G *9/08*
U.S. Cl. 5—413 **4 Claims**



1. A sleeping bag or the like with body heat conserving properties comprising a composite envelope having opposed ends, said envelope being sealed at one end and open at the other end, said envelope comprising an inner layer of paper, an overlying outer layer of paper and an intermediate layer therebetween, said intermediate layer comprising a first sheet of corrugated or dimpled paper, a second intermediate sheet of flat paper overlying said first sheet of paper, and a third sheet of corrugated or dimpled paper in register with the first and second sheets and overlying said second sheet, said intermediate layer providing cushioning and insulative properties between said inner and outer layers.

4,977,633
COLLAPSIBLE AIR BED
Robert B. Chaffee, 78 Montgomery St., Boston, Mass. 02116
Filed Jul. 25, 1989, Ser. No. 384,786
Int. Cl.[5] A47C *27/08*
U.S. Cl. 5—453 **21 Claims**



12. An inflatable bed comprising:
an inflatable bladder having first and second sides;
a roller assembly attached to one of said first and second sides, said bladder being wound on said roller assembly for storage;
means including a one way valve connected to said bladder through which gas is infused to inflate said bladder; and
a motor driven pump connected to said means for inflating said bladder through said valve and unrolling said bladder from said roller assembly.

4,977,634

PILLOW WITH POISONOUS GAS REMOVING COVER

Seinosuke Koji, 596-1 Ooaza Tokida, Tohbu-machi, Chisagata-gun, Nagano 389-05, Japan

Filed Sep. 29, 1989, Ser. No. 415,107
Int. Cl.[5] A47G 9/00; A62B 7/10
U.S. Cl. 5—434 8 Claims

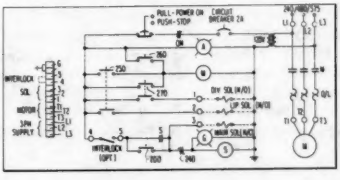
1. A lifesaving pillow comprising
filler material,
a member located around said filler material,
said member being formed of flexible and air-permeable sheet material, and
said sheet material including a poisonous gas removing layer containing an antigas agent for removing poisonous gas.

4,977,635

CONTROL CIRCUIT FOR VERTICALLY STORING DOCK LEVELER

James C. Alexander, London, Canada, assignor to Serco Corporation, Ontario, Canada

Filed Jun. 30, 1989, Ser. No. 373,547
Int. Cl.[5] E01D 1/00
U.S. Cl. 14—71.3 4 Claims



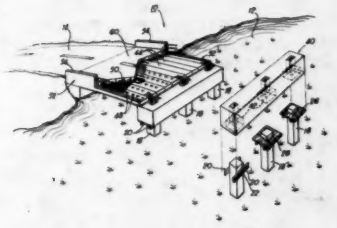
1. A control circuit for a vertically storing dock leveler, said leveler comprising a platform and a main hydraulic cylinder for controlling a position of said platform, said control circuit comprising:
normally closed valve means for normally closing off fluid flow from said main hydraulic cylinder; and
raising and lowering means for raising and lowering said platform, including:
a raising and a lowering switch, each having at least two positions; and
an electric circuit, responsive to at least one of said at least two positions of said lowering switch, for opening said normally closed valve means to enable flow of fluid to and from said main hydraulic cylinder, said electric circuit being responsive to at least one of said at least two positions of said raising switch for closing said normally closed valve means to prevent flow of fluid from said main hydraulic cylinder, said electric circuit further being responsive to interruption of electric power, normally applied thereto, to prevent said flow of said fluid from said main hydraulic cylinder, wherein said electric circuit comprises at least first and second relays, said first relay being energized in response to said at least one of said at least two positions of said lowering switch for opening said normally closed valve means, said second relay being energized in response to said at least one of said at least two positions of said raising switch for closing said normally closed valve means.

4,977,636

PILE SUPPORTED BRIDGE ASSEMBLY

John B. King, 130 Kramer Ave., Winston-Salem, N.C. 27113

Filed Aug. 30, 1989, Ser. No. 400,362
Int. Cl.[5] E01D 19/00; E04B 1/16
U.S. Cl. 14—73 20 Claims



1. A bridge assembly having a longitudinal axis comprising a plurality of generally vertical support piles disposed in a prearranged grid pattern, said piles being uniformly spaced and disposed in lateral rows and longitudinal rows relative to said longitudinal axis, a cap member disposed over each of said lateral rows of piles and generally perpendicular to said longitudinal axis and having a plurality of spaced, integral cavities formed in said cap member for receiving said piles, slab means disposed over and extending between successive cap members for providing a base for said bridge assembly, and a road surface covering said slab means.

4,977,637

MAGNETIC WINDOW CLEANING APPARATUS

Rodney C. Demers, 317 7th St. E., Bradenton, Fla. 34208

Filed Feb. 16, 1990, Ser. No. 480,846
Int. Cl.[5] A47L 1/08
U.S. Cl. 15—104 R 8 Claims

1. Magnetic window cleaning apparatus for simultaneously cleaning the inner and outer surfaces of a window comprising:
a plurality of rectilinear magnets having opposed surface areas and opposed edges;
said opposed surface areas being substantially larger than said opposed edges;
one of said opposed surface areas on each said magnet having one polarity and the other of said opposed surface areas having the other polarity;
a manually movable window inside surface unit having a rectilinear base including a base wall with an outer base surface;
a first plurality of said rectilinear magnets disposed in said inside surface unit adjacent to said base wall;
each of said magnets in said first plurality having said one

polarity surface area adjacent to said base wall of said inside surface unit;

a magnetically movable rectilinear window outside surface unit having a base wall with an outer base surface;

a second plurality of said rectilinear magnets disposed in said outside surface unit adjacent to said base wall;

each of said magnets in said second plurality having said other polarity surface area adjacent to said base wall of said outside surface unit.

4,977,638

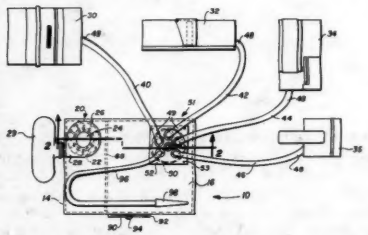
DUST COLLECTION APPARATUS

Albert M. Best, 5 Kutz Ave., New Holland, Pa. 17557

Filed Sep. 5, 1989, Ser. No. 402,559

Int. Cl.[5] F23J *1/00*; A47L *5/36*

U.S. Cl. 15—301 **7 Claims**



1. Apparatus for collecting wood dust and the like from a plurality of work stations and depositing the dust in a container, said container being supported on a floor and said work stations also being located on said floor grouped around the container in proximity thereto, said container having a top wall extending in a horizontal direction and having a series of holes therein, a plurality of suction hoses, there being one hose for each work station, each hose having an inlet end at an associated work station and an outlet end at said container top wall, means for attaching the outlet ends of the hoses to said container, each to one of said holes, an air valve disc, means mounting said disc on said container for rotational movement relative thereto, said disc having a cut-out registrable with said series of holes one hole at a time depending on the position of rotation of the disc, said disc closing off the other holes when the cut-out is aligned with a selected hole, and means to generate a vacuum in said container.

4,977,639

FLOOR DETECTOR FOR VACUUM CLEANERS

Yutaka Takahashi; Yoshihiro Noguchi; Takahiro Yanagida, and Tomohisa Imai, all of Saitama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo and Mitsubishi Electric Home Appliance Co., Ltd., Saitama, both of, Japan

Filed Aug. 14, 1989, Ser. No. 392,897

Claims priority, application Japan, Aug. 15, 1988, 63-201942; Aug. 15, 1988, 63-201943; Aug. 15, 1988, 63-201944; Aug. 15, 1988, 63-201945; Aug. 15, 1988, 63-201947; Aug. 15, 1988, 63-201948

Int. Cl.[5] A47L 9/28

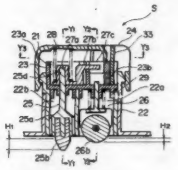
U.S. Cl. 15—319 **8 Claims**

1. A floor detector for a power brush of a vacuum cleaner comprising:

a housing adapted to be mounted to said power brush;

a lift sensor (S1) having a first movable member (25) reciprocally movably housed in said housing, and a first spring (28) for urging said first movable member outwardly of said housing, said first spring having a first spring constant, said first movable member having a first contact projecting outwardly of said housing, said first contact causing said first movable member to yieldably displace when said power brush is placed on a floor;

a floor sensor (S2) having a second movable member (26) reciprocally movably housed in said housing and a second spring (29) for urging said second movable member outwardly of said housing, said second spring having a spring constant larger than said first spring constant of said first spring, said second movable member having a second contact projecting outwardly of said housing, said second contact causing said second movable member to yieldably displace vertically a first distance when said power brush



is placed on a relatively hard floor and to yieldably displace vertically a second distance when said power brush is placed on a relatively soft floor;

a first displacement sensor (31) housed in said housing and detecting displacement of said first movable member;

a second displacement sensor (32) housed in said housing and detecting displacement of said second movable member; and

control circuit means for correlating signals from said first and second displacement sensors to operate the power brush.

4,977,640

FLOOR NOZZLE FOR VACUUM CLEANER

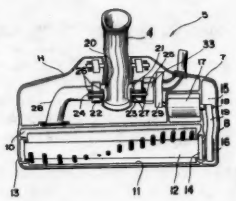
Akihiro Hirano, Yokaichi, and Seizo Hayashi, Omihachiman, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 18, 1989, Ser. No. 381,280

Claims priority, application Japan, Jul. 22, 1988, 63-184346

Int. Cl.[5] A47L *5/30*

U.S. Cl. 15—339 **11 Claims**

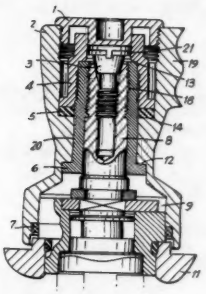


1. A floor nozzle for a vacuum cleaner which comprises a housing, and an agitator, a driving motor for the agitator, and a switch for changing over rotating directions of said motor which are accommodated in said housing, a coupling pipe connected to said housing so as to be displaceable at least back and forth, and communicated with a suction passage to a vacuum cleaner main body, and an associating means for transmitting the back and forth displacement of said coupling pipe to said switch, said associating means being adapted to be held at two stabilized positions with respect to a boundary dead point and provided with a movable member arranged to be displaced, through quick action, to one of the stabilized positions after passing through said dead point, said movable member being associated with said switch.

4,977,641
LEVER HANDLE ASSEMBLY FOR SANITARY FIXTURES

Rudolf Steffes, Mueckeln, Fed. Rep. of Germany, assignor to American Standard Inc., New York, N.Y.

Continuation of Ser. No. 246,365, Sep. 19, 1988, abandoned. This application May 17, 1990, Ser. No. 524,715
Claims priority, application Austria, Sep. 24, 1987, 2427/87
Int. Cl.[5] G16K 5/00, 31/00
U.S. Cl. 16—121 3 Claims



1. A lever handle assembly for a sanitary fixture, which includes a spindle for actuating said fixture, said lever handle assembly comprising:

a handle adapter for a non-rotatable connection over said spindle;

a handle sleeve having an [long] elongated handle lever, said handle sleeve having an annular flange; and

a friction coupling for coupling said handle adapter to said handle sleeve, said annular flange having an upper shoulder, said friction coupling including an elastic O-ring supported on said upper shoulder of said annular flange, a clutch sleeve for pressing said O-ring against said upper shoulder, whereby said spindle can be selectively opened or closed by actuating said handle lever.

4,977,642
DOOR MOUNTING WITH SIDE OPENING FOR INSERTION OF PIVOT PIN

Mario Marinoni, Magenta, Italy, assignor to Casma S.p.A., Magenta, Italy

Filed Feb. 9, 1989, Ser. No. 308,015
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1988, 3806199
Int. Cl.[5] E05D 7/10, 7/12
U.S. Cl. 16—257 11 Claims

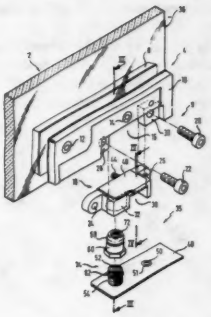
1. A door mounting comprising:

a fitting member for receiving a vertical edge of a door, said fitting member having a first recess;

an insert member provided within said first recess, said insert member having a second recess that is accessible via a first opening provided in a vertical wall being at a right angle to said vertical edge of said door, and a second opening in a horizontal wall of said insert member, said first and second openings being contiguous, wherein said second recess is configured to receive a pivot pin such that said pivot pin can move horizontally within said insert member;

a pivot pin inserted into said second recess; and

an abutment member provided on a wall of said insert member, a portion of said abutment member extending into said second recess through said first opening in said vertical wall of said insert member, whereby said portion of said abutment moves from an initial position upon insertion of said pivot pin through said opening in said vertical wall of said insert member, said portion returning to said initial



position after insertion to secure said pivot pin within said second recess.

4,977,643
FISH SKINNING DEVICE, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Arnold Prysock, 10423 Capitol Pl., St. Louis, Mo. 63131

Filed Mar. 30, 1989, Ser. No. 330,744
Int. Cl.[5] A22C 11/00
U.S. Cl. 452—187 19 Claims

1. A device for supporting fish during skinning, scaling or other cleaning operations, comprising:

first means for securely engaging a fish;

brace support means, connected with said first means and a horizontal member connecting said brace means and said first means, for suspending said first means from a substantially vertical support member such that said first means is horizontally spaced from said support members;

attachment means for attaching said brace support means to said vertical support member; and

an end cap provided on said horizontal member.

4,977,644
FISH HOLDER

Andrew L. Evans, Box 647, Magalia, Calif. 95954, and Paul A. Behr, 5556 Wilson Landing Rd., Chico, Calif. 95926

Filed Feb. 27, 1989, Ser. No. 316,303
Int. Cl.[5] A22C 25/00
U.S. Cl. 452—195 12 Claims

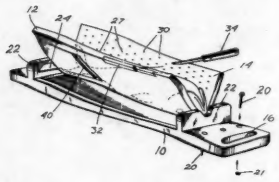
1. A fish holder to allow convenient cleaning of a fish, comprising in combination;

a base means having a front end, a back end, two narrow lengthwise sides and a top and bottom surface; said base means having two spaced support walls one affixed trans-

versely to said top surface adjacent each said end to support,

two fish support means each having a front end, a back end, narrow lengthwise side edges and an interior and an exterior surface;

attachment means between said support walls and said fish support means, wherein at least one pin extending from each said end of each said fish support means is movably housed in grooves in the inward facing surfaces of said



support walls with said attachment means including means for releasably locking both said fish support means in an upwardly and outwardly V-angled position, and means for positioning both said fish support means one on top of the other with said interior surfaces interfacing in parallel alignment with said top surface of said base means;

means on said interior surface of at least one said fish support means to prohibit the body of said fish from sliding with said fish support means in said locked V-angled position.

4,977,645

APPARATUS FOR REMOVING FOREIGN METAL BODIES FROM A FIBER TRANSPORTING DUCT

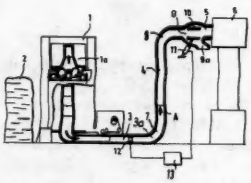
Fritz Hösel, Monchen-Gladbach, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Jul. 24, 1989, Ser. No. 383,637

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825109

Int. Cl.[5] D01B 3/00

U.S. Cl. 19—200 **20 Claims**



1. In a system for removing foreign metal bodies from a pneumatically conveyed stream of fiber material, in combination with two serially arranged fiber processing machines; the system including

a fiber conveying duct in which the fiber material is pneumatically advanced from one of the fiber processing machines to the other; a branch-off location in the duct;

a branch conduit joining said duct at said branch-off location and extending away from said duct;

a metal detector means for ascertaining the presence of a foreign metal body in the stream of fiber material at a sensing location upstream of said branch-off location as viewed in the direction of fiber advance in the duct;

channelling means arranged in said branch-off location and having a first and a second position for selectively directing the fiber stream into the branch conduit or, respectively, causing the fiber stream to continue travel in said duct past said branch-off location dependent on the position of the channelling means; and

control means operatively connected to said metal detector means and said channelling means for moving said channelling means from said second position to said first position upon ascertaining the passage of a foreign metal body by said detector means;

the improvement comprising at the most two bends in said duct for changing the direction of travel of fiber material in said duct for allowing a shortening of distance between the two fiber processing machines; said bends being situated between said branch-off location and said sensing location.

4,977,646

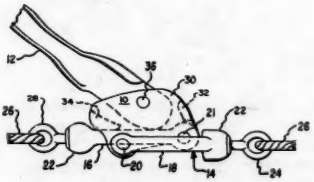
CAM ASSISTED LOAD BINDER

Clarence L. McCraw, East Ridge, Tenn., assignor to Columbus McKinnon Corporation, Amherst, N.Y.

Filed Jan. 30, 1990, Ser. No. 472,274

Int. Cl.[5] B66F 3/00

U.S. Cl. 24—68 CD **19 Claims**



1. An over center load binder assembly comprising a crank member, a clevis type draw bar with leg elements pivotally connected to a first portion of said crank member, a pull link pivotally connected to a second portion of said crank member and dimensioned to at least in part fit between leg portions of said clevis type draw bar, and a lever handle pivotally connected to said crank member for movement about an axis between said first and second portions, said level handle includes a cam surface, facing radially outwardly of said axis and having a maximum lobe swell sufficient to contact a surface of said pull link and displace said pull link from an alignment between said leg portions of said clevis type draw bar to release said load binder.

4,977,647

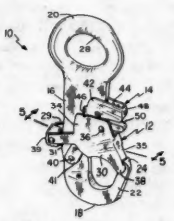
DOUBLE LOCKING SNAP HOOK

Scott C. Casebolt, North St. Paul, Minn., assignor to D.B. Industries, Inc., Red Wing, Minn.

Filed Oct. 27, 1989, Ser. No. 427,716

Int. Cl.[5] A44B 13/02

U.S. Cl. 24—599.5 **17 Claims**



1. A double locking snap hook, comprising:

a shank having a first end and a second end, said shank

having a return portion at said first end to define a hook, said return portion including a nose spaced from the shank to define a hook throat;

a spring biased latch member including a latch body, first spring means within said latch body for urging said latch member into a first, latched position, said latch body further including a first end pivotally mounted on said shank and a second end engageable with said hook nose to close said hook throat, said latch member being movable between said first, latched position and a second, open position, said second end of said latch body engaging said hook nose when said latch member is located in said first, latched position; and

spring biased locking means passing through said latch member, said locking means being pivotally attached to said shank for releasably locking said latch member into said first, latched position, said spring biased locking means including a lock body and a second spring means within said lock body for urging said locking means into a locking position in restraining engagement with said latch member when said latch member is located in said first, latched position.

4,977,648

DEVICE AT A SNAP-IN LOCK

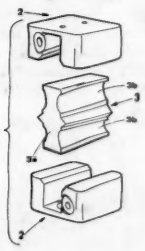
Ove Eckerud, Linköping, Sweden, assignor to Conforex AB, Linkoping, Sweden

PCT No. PCT/SE88/00225, § 371 Date Oct. 31, 1989, § 102(e) Date Oct. 31, 1989, PCT Pub. No. WO88/08914, PCT Pub. Date Nov. 17, 1988

PCT Filed May 4, 1988, Ser. No. 435,412

Int. Cl.[5] A44B *17/00*

U.S. Cl. 24—573.1 **6 Claims**



1. An arrangement for a snap lock, comprising:

a first component including a projecting part;

a second component including a cavity corresponding to said projecting part into which said projecting part is capable of being introduced;

at least one indentation defined in one of the projecting part and the cavity, said indentation being arranged across the direction of introduction of said second component into said first component; and

a snap device associated with the other of the projecting part and the cavity, said snap device being adapted to snap into engagement with said indentation upon introduction of said second component into said first component, thereby producing a locking function therebetween;

wherein said first and second components comprise respective pieces of extruded profile strips of rigid material cut to substantially equal lengths, and said snap device comprises a piece of profile strip of a flexible material, said snap device further comprising an undercut groove extending through said component associated with said other of the projecting part and the cavity and having an opening, said profile strip of said snap device exhibiting a cross-sectional shape such that upon introduction into said undercut groove said profile strip of said snap device substantially occupies said undercut groove and is retained therein, said undercut groove having an undercut profile that follows the external form of the profile strip of said snap device along more than half of its circumference, the remaining portion of its circumference extending out of said opening and being yieldable during introduction of said second component into said first component and thereafter substantially filling said indentation.

4,977,649

CONNECTING DEVICE

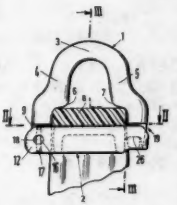
Reinhard G. E. Smetz, Baldingen, Fed. Rep. of Germany, assignor to RUD-Kettenfabrik Rieger & Dietz GmbH u. Co., Aalen, Fed. Rep. of Germany

Filed Jul. 25, 1988, Ser. No. 224,068

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726738

Int. Cl.[5] A44B *13/00*

U.S. Cl. 24—573.1 **33 Claims**



1. Connecting device for at least two components to be mutually connected, such as belts, belt slings, ropes, rope slings, chain links, hooks, or rings, having a receiver for at least one of the components which is formed by a basic unit (1, 27, 33, 34, 35, 37, 41, 43, 46, 53) of the connecting device and by a closing element (2, 29, 47, 52), one end of said closing element being connectable to the basic unit (1, 27, 33, 34, 35, 37, 41, 43, 46, 53) by a retaining bolt (16) receivable into aligned bores (13, 14, 15) of mutually overlapping parts of the basic unit (1, 27, 33, 35, 37, 41, 43, 46, 53) and of the closing element (2, 29, 47, 52) and the other end of said closing element being connectable to the basic unit (1, 27, 33, 34, 35, 41, 43, 46, 53) by a pivot bearing having a cross beam (20) on which the closing element (2, 29, 47, 52) is mounted pivotally, said closing element being pivotal between a locked and an unlocked position, characterized in that the cross beam (20) of the pivot bearing is integrally formed on the basic unit (1, 27, 33, 34, 35, 37, 41, 43, 46, 53), and the closing element is connectable to said bearing only in the unlocked position.

4,977,650

BUCKLE ASSEMBLY

Kazuo Ida, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Mar. 5, 1990, Ser. No. 489,041

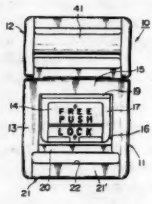
Claims priority, application Japan, Mar. 10, 1989, 1-27950[U]

Int. Cl.[5] A44B *11/25*

U.S. Cl. 24—614 **11 Claims**

1. A buckle comprising a plug including a protuberant arm having first engaging means; and a socket adapted to be releasably coupled with the plug; the socket including a socket body including a pair of spaced upper and lower walls, a pair of side walls joining the upper and lower walls on their respective sides and a rear wall provided on the rear end of the lower wall to thus define therebetween a guide chamber open forwardly, the lower wall having a cantilevered resilient engaging flap projecting from its inner surface toward the rear wall and having second engaging means for snapping engagement with the first engaging means of the plug, the upper wall having a

cantilevered resilient presser flap overhanging the cantilevered resilient engaging flap and being yieldable downwardly to thus depress the resilient engaging flap; and a locking plate having



an abutting means and slidably mounted on the presser flap for causing the abutting means to come into abutting engagement with the rear wall, to thus lock the plug and the socket in coupled disposition.

4,977,651

COVERING DEVICE FOR A FABRIC INLET AND OUTLET SLOT OF TENTER HOUSING

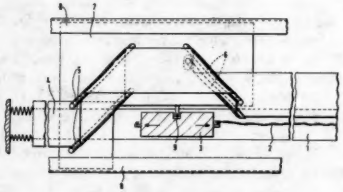
Theo Schiffers, Wurselen, Fed. Rep. of Germany, assignor to H. Krantz GmbH & Co., Wurselen, Fed. Rep. of Germany

Filed Nov. 7, 1989, Ser. No. 432,468

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1988, 3838618

Int. Cl.[5] D06C *3/00*; F26B *13/02*

U.S. Cl. 26—106 **6 Claims**



6. A covering device for an entrance or exit slot of a tenter, said tenter including a chain guide projecting through and transversely movable within said slot, comprising a tensioned flexible polymeric strip having its end portions secured adjacent the extremities of said slot, said strip outwardly lapping said slot, a deflector member operatively connected to said guide for movement with said guide longitudinally of said slot, said strip being arrayed over said deflector member and deformed by said deflector member into a generally U-shaped configuration encompassing the portions of said chain guide extending through said slot.

4,977,652

TREE FOREST CEMETERY

Gray Graham, 5454 Peterson La. #1030, Dallas, Tex. 75240

Filed Nov. 13, 1989, Ser. No. 434,292

Int. Cl.[5] A61G *17/00*

U.S. Cl. 27—1 **7 Claims**

1. A cremation cemetery comprising:

a plot of land divided into a plurality of lots each having located therein a vault buried in the ground with a needleleaf tree planted above it so that the roots of said tree grow around the sides of said vault; and

a tube attached to and communicating with said vault, said tube extending at an angle from said vault to a location above said ground and on the side of said tree whereby

urns containing cremated remains can be lowered into said tube and placed therein into said vault.

4,977,653

APPARATUS FOR NEEDLING A WEB SUPPORTED BY A GRATE OF BLADES TRANSVERSE TO NEEDING DIRECTION

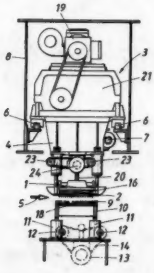
Hannes Pum, Wels, Austria, assignor to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria

Filed Jan. 30, 1990, Ser. No. 472,605

Claims priority, application Austria, Feb. 15, 1989, 333/89

Int. Cl.[5] D04H *18/00*

U.S. Cl. 28—115 **4 Claims**



1. In an apparatus for needling a web comprising

a deck provided with a grate of parallel blades for supporting a web which is to be needled,

at least one needle board, which comprises a multiplicity of spaced apart needles and is operable to needle said web by means of said needles as said web is supported on said grate and moved in a predetermined direction of travel on said grate, and

a stripper plate, which is disposed between said needle board and said grate and formed with through holes for receiving respective ones of said needles,

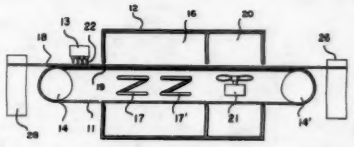
the improvement residing in that said blades extend transversely to said direction of travel.

4,977,654

PROCESS AND APPARATUS FOR CRIMPING FIBERS

Francis P. McCullough, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 18, 1989, Ser. No. 340,099
Int. Cl.[5] D02G *1/00, 1/04;* D02J *1/00*
U.S. Cl. 28—278 16 Claims



1. A process for crimping and heat setting a filament or tow of filaments without applying non-uniform stress or tension comprising the steps of:

supplying a filament or tow of filaments across an apertured conveying means having a planar surface;

inserting said filament or tow of filaments into at least two apertures of said conveying means so that the filament or tow of filaments is maintained in a non-linear configuration;

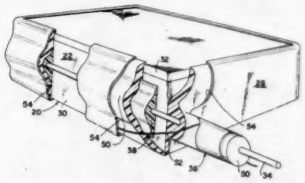
thereafter passing said non-linear filament or tow of filaments in said unstressed condition through at least one heating zone at a temperature so as to at least partially permanently set said filament or tow of filaments, and then cooling said filament or tow of filaments while in a non-linear configuration, whereby a non-stressed crimp is obtained.

4,977,655

METHOD OF MAKING A TRANSDUCER

Michael A. Martinelli, Winchester, Mass., assignor to Intra-Sonix, Inc., Burlington, Mass.

Division of Ser. No. 151,394, Feb. 2, 1988, which is a continuation-in-part of Ser. No. 129,830, Dec. 8, 1987, Pat. No. 4,821,731, which is a continuation-in-part of Ser. No. 856,621, Apr. 25, 1986, abandoned. This application Apr. 18, 1989, Ser. No. 340,383
Int. Cl.[5] A61B *8/12*
U.S. Cl. 29—25.35 22 Claims



1. A method of making a transducer of the type including (a) a substrate having a first surface for supporting a piezoelectric device including a sheet of piezoelectric material, and (b) a coaxial line having an inner and outer conductor for providing a potential to opposite sides of said sheet of piezoelectric material, said method comprising the steps of:

mounting said sheet of piezoelectric material on said first surface of said substrate so that one side of said sheet and said first surface mutually confront one another;

electrically coupling the center conductor of said coaxial line to said one side of said sheet;

encasing the entire substrate, except for said first surface, with a first layer of an electrically insulative material so that said first layer is attached to said substrate; and

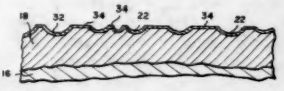
applying a second layer of electrically conductive material so as to (1) attach said second layer to said first layer of electrically insulative material so as to cover said first layer, (2) form an electrical path between the outer conductor of said coaxial line and the other side of said sheet of piezoelectric material and (3) completely encase said substrate and said sheet of piezoelectric material in an electrically conductive material so that said substrate and sheet are electrically shielded.

4,977,656

NICKEL COATED SHOT BLASTED WEB CONVEYING ROLLER

Daniel C. Lioy; Edward F. Hurtubis, both of Rochester, and Edward R. Schickler, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 282,661, Dec. 12, 1988, Pat. No. 4,914,796.
This application Aug. 28, 1989, Ser. No. 401,883
Int. Cl.[5] B21B *27/02*
U.S. Cl. 29—121.8 2 Claims



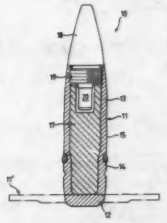
1. A web conveyance roller comprising a steel core and a thin layer of nickel on the core, the nickel layer having a surface with generally spherical down features, the depth of the down features being greater than about 500 microinches but less than about 1000 microinches, many of the down features overlapping to form interconnected channels comprising at least 50% of the surface area of the roller, and a plurality of plateaus between the channels comprising at least 20% of the surface area of the roller.

4,977,657

METHOD OF PRODUCING A FRAGMENTATION JACKET

Walter Engel, Schwerzenbach; Franz Moser, Weisslingen, and Hugo Sigrist, Hinwil, all of Switzerland, assignors to Werzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Sep. 27, 1989, Ser. No. 413,090
Claims priority, application Switzerland, Oct. 27, 1988, 04005/88
Int. Cl.[5] B21K *21/06*
U.S. Cl. 29—1.21 12 Claims



1. A method of producing a fragmentation jacket for a projectile comprising within the fragmentation jacket an explosive charge which is detonated by a fuze, comprising the steps of:

producing a blank in the form of a disk;

impressing into the disk impressions defining reference fracture locations in the form of grooves;

said step of impressing into the disk impressions defining reference fracture locations in the form of grooves entailing the step of impressing into at least one side of the disk substantially concentric annular grooves and substantially radial grooves having a smaller preselected depth than that of said substantially concentric annular grooves;

subjecting the grooves-containing disk to a shaping operation, thereby forming a fragmentation jacket having a predeterminate configuration;

said step of producing said blank in the form of a disk entailing the step of producing a disk comprising a central portion, an intermediate annular portion and an outer annular portion having a different thicknesses relative to each other;

during said step of impressing into said disk said substantially concentric annular grooves and said substantially radial grooves having said smaller preselected depth than said substantially concentric annular grooves, impressing said substantially concentric annular grooves and said substantially radial grooves, at least into said intermediate annular portion of said disk; and

said step of subjecting the grooves-containing disk to the shaping operation forming said fragmentation jacket entailing the step of forming a substantially cup-shaped fragmentation jacket having opposite end portions and a substantially cylindrical intermediate portion of different wall thicknesses which correspond to said different thicknesses of the portions of said disk and which define said predeterminate configuration of said fragmentation jacket and thereby forming, at least in an inner surface and at least in said substantially cylindrical intermediate portion, substantially lengthwise grooves corresponding to said substantially radial grooves of said disk and substantially concentric circumferential grooves corresponding to said substantially concentric annular grooves to said disk, wherein said lengthwise grooves have a smaller preselected depth than that of said circumferential grooves.

4,977,658

SENSOR AND METHOD FOR THE PRODUCTION THEREOF

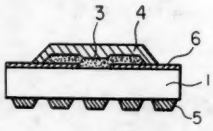
Hiroshi Awano, Yonezawa; Yuka Kawabata, Yokohama, and Takayoshi Iwai, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Oct. 31, 1988, Ser. No. 264,663

Claims priority, application Japan, Oct. 31, 1987, 62-276806

Int. Cl.[5] G01R *3/00*; H01S *43/00*

U.S. Cl. 29—25.01 **3 Claims**



3. A method for the production of a sensor, comprising the steps of:

forming a first electrode on a substantial portion of an insulating substrate, the first electrode is formed of a thin film conductor of a metallo-organic compound obtained by a pyrolysis;

coating a semiconductor layer on the first electrode and on said insulating substrate, said semiconductor layer having electrical property changeable in accordance with an atmosphere and having a thickness of approximately 1 μm; and

forming a second electrode on said coating layer to oppose the first electrode and on said insulating substrate, the second electrode is formed of a thin film conductor of a metallo-organic compound obtained by pyrolysis at approximately 600° C., said first and second electrodes each having a thickness of approximately 0.5 μm.

4,977,659

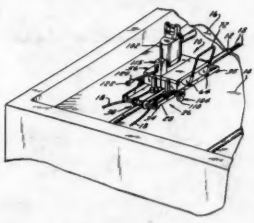
TOOL FOR SEATING TUBING IN A CONCEALED ROOFING BASE RAIL

Delano H. Ristow, 10015 Steinthal Rd., Kiel, Wis. 53042, and Daniel B. Ristow, 14341 Riverton Cir., Westminster, Calif. 92683

Filed Dec. 29, 1989, Ser. No. 458,949

Int. Cl.[5] B23P *19/02*

U.S. Cl. 29—235 **15 Claims**



1. A tool for seating sheathing material covering a supporting roof structure in the grooves on each side of a base rail mounted on the supporting roof structure to secure the sheathing material to the base rail, said tool comprising a frame divided into a first section and a second section, a wheel mounted on the front and back of each of said sections for supporting the frame for movement on the supporting roof structure, a housing mounted on each section of said frame, guide means mounted on the frame on each side of the base rail for aligning the tubular members with the grooves on each side of the base rail, means mounted in each of said housings for seating the tubular members in the grooves and means for driving the frame along the base rail whereby the tubular members are seated in the grooves as the tool moves along the base rail.

4,977,660

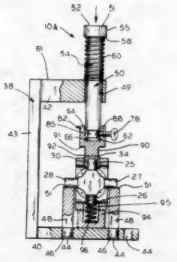
TOOL FOR REMOVING AND INSTALLING AN AUTOMOTIVE UNIVERSAL JOINT

Wade Maynard, 4281 Wakonda Dr., Norwalk, Iowa 50211

Filed Nov. 13, 1989, Ser. No. 435,250

Int. Cl.[5] B23P *19/02*

U.S. Cl. 29—251 **11 Claims**



1. A tool for removing and inserting a coupling cap inside an opening in an arm of a yoke to respectively disconnect and connect the universal joint to the yoke, said cap operatively covering the outer end of one of the projections of th U-joint and being in a press fit association in said opening between the side wall defining said opening and the projection of the U-joint, and said tool comprising:

a frame including a base and a bar spaced from the base, said bar having a cavity formed therethrough;

a pair of spaced apart anvils removably associated with said base, said U-joint and yoke being supported on said anvils in a fixed position;

a rod having an outer end section, an inner end section and a body section therebetween, said rod being movably received in said cavity of said bar;

an impact cup having an inner bore and a outer bore;

means for removably securing the inner rod section in said outer bore;

said impact cup including a lip encircling an entrance into said inner bore when the tool is used to disconnect the U-joint from the yoke;

said lip of the cup forceably impacting an area of the arm of the yoke circumscribing the opening containing said cap in response to the application of an external force to said rod to release said cap from said press fit association and cause said cap to move outwardly and into said inner bore; and

an elongated spring encircling the body of said rod and positioned between said bar and the outer end portion of the rod to hold the rod in a normal position spaced from the yoke, said spring compressing between said bar and said outer end portion of the rod as said rod is moved inward for impacting said area, said spring expanding after said force is removed to return said rod to said normal position; and

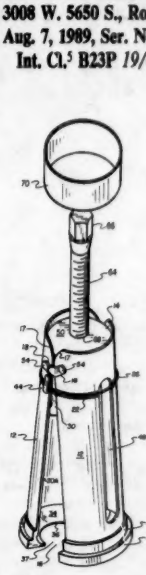
the lower end of the rod including a piston removably attached to the inner end portion of the rod when the tool is used for connecting the U-joint to the yoke, said piston pushing said cap in said press fit association inside said opening in the yoke in response to said application of said force to said rod.

4,977,661

CARRIER BEARING AND AXLE BEARING PULLER

Thomas H. Wood, 3008 W. 5650 S., Roy, Utah 84067

Filed Aug. 7, 1989, Ser. No. 390,534
Int. Cl.[5] B23P *19/04*
U.S. Cl. 29—261 15 Claims



1. An apparatus for use in removing a bearing from its support mounting, said apparatus comprising:

a housing configured to be hollow and positionable about a bearing to be removed, to form a barrier enclosure about said bearing for protecting a user against fragments of said bearing which explodes during a removal thereof from its support mounting, said housing including a lip extension detachably mounted thereon adapted to be inserted beneath and engage an outer race of said bearing; and

a drive means displaceably mounted on said housing, for applying a disengagement force against a support mounting of said bearing;

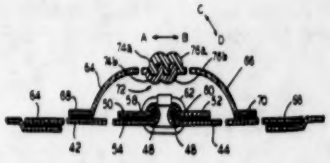
wherein an application of said disengagement force against said support mounting causes said housing to be displaced vis-a-vis said support mounting, thereby displacing said bearing from its mounting due to said lip's engagement with said outer race.

4,977,662

AIRTIGHT WATERTIGHT MECHANICAL SEAM FOR JOINING PANELS OF INDUSTRIAL STRENGTH FABRICS

Jack Moreland, Dolton, Ill., assignor to MPC Containment, Chicago, Ill.

Continuation of Ser. No. 27,563, Mar. 18, 1987, which is a division of Ser. No. 886,917, Jul. 16, 1986, which is a continuation of Ser. No. 523,657, Aug. 15, 1983. This application Aug. 5, 1988, Ser. No. 230,672
The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.
Int. Cl.[5] A44B *17/00*
U.S. Cl. 24—389 1 Claim



1. An airtight, watertight mechanical seam for joining two large area panels of industrial fabric comprising:

(a) at least two large area panels made of industrial strength fabric including an elastomer reinforced with fabric;

(b) cable means attached to and running along at least one edge of each of said two large area panels of fabric, said cable means at said edges of said two panels confronting each other at said seam;

(c) connector means for mechanically joining said cable means of said two panels at periodic locations along said confronting edges, the seam formed by said cables and joining means being substantially as strong as said industrial strength fabric;

(d) panel flaps attached in a waterproof manner to said fabric at locations which are near and run along at least said one edge of each of said two panels of fabric, said flaps being so attached at locations which are between said cable means and an expanse or said panel; and

(e) slide closure means for joining and sealing together said panel flaps and forming a continuous waterproof surface extending across a joint formed by said cable means and said connector means.

4,977,663

METHOD FOR SECURING WORKPIECES OF COMPOSITE MATERIALS

Ramon L. Hurd, Fountain Valley, Calif., assignor to Huck Manufacturing Company, Irvine, Calif.

Division of Ser. No. 196,881, May 20, 1988, Pat. No. 4,850,771, which is a continuation of Ser. No. 851,498, Apr. 1, 1986, abandoned. This application Apr. 18, 1989, Ser. No. 339,677
Int. Cl.[5] B23P *11/02, 19/06*
U.S. Cl. 29—525.2 7 Claims

1. A method for securing together a plurality of workpieces of a composite type material with a fastener which is adapted to be located in aligned bores in such workpieces with a preselected interference fit and with the fastener adapted to secure such workpieces varying in total thickness from a preselected maximum to a preselected minimum total thickness, comprising the steps of:

forming a pin member to have an elongated shank and an enlarged head at one end, an enlarged diameter smooth

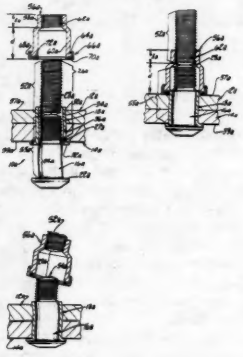
shank section adjacent said pin head, a helically threaded pin section extending generally from said smooth shank section to the opposite end of said pin member having a root diameter, and an annular breakneck groove having a depth defining a shank diameter substantially less than the root diameter of said threaded pin section and located within said threaded pin section to define a frangible portion at the free end of said threaded pin section, said breakneck groove being the weakest section of said pin member and adapted to fracture at a preselected load of generally low magnitude,

forming said threaded pin section to have a maximum diameter less than the diameter of said smooth shank section,

forming a thin gauged expansion sleeve to have a tubular portion with an enlarged annular flange at one end, said sleeve having an inside diameter greater than said maximum diameter of said threaded pin section and less than the diameter of said smooth shank section,

forming said tubular portion of said sleeve to have a length no less than around the maximum total thickness of the workpieces, and to have an outside diameter permitting insertion of said sleeve into the workpiece bores,

forming a nut member to have a helically threaded nut section at one end and an enlarged head portion at its opposite end, said enlarged head portion having an enlarged counterbore having a diameter greater than the



outside diameter of said tubular portion of said sleeve, said counterbore having an axial depth at least equal to the maximum extension of said sleeve tubular portion beyond the workpieces for workpieces of minimum total thickness, said threaded nut section having a preselected axial length,

forming said frangible portion of said threaded pin section to have an axial length no less than around one half of the axial length of said threaded nut section, said nut member having a preselected overall axial height,

forming said pin member to have the length of that portion of said threaded pin section from said smooth shank section to said breakneck groove no less than about the total thickness of said workpieces,

forming said pin member to have the length of that portion of said pin shank from said pin head to said breakneck groove no greater than around the sum of the maximum total thickness of the workpieces, said preselected height of said nut member and the thickness of said sleeve flange,

forming said threaded pin section to be continuously threaded over its full length and at least said frangible portion to be of the same thread size as said nut member whereby said nut member can be threaded onto said threaded pin section,

forming said breakneck groove to have an axial strength at least equal to the maximum axial load required to pull said pin member fully into said sleeve with said smooth pin shank section expanding said sleeve into the workpiece bores to provide the preselected interference fit,

locating said sleeve into said workpiece bores and locating said pin member within said sleeve such that said smooth shank portion engages the inside diameter of the sleeve at said annular flange and the frangible portion of said threaded pin section extends beyond the sleeve,

threading said nut member onto said frangible portion of said pin,

applying torque to said nut member thereby rotating said threaded nut portion onto said threaded pin section and with said enlarged end section engaging the confronting one of the workpieces, and continuing to apply torque thereby pulling said smooth shank section of said pin member into said sleeve, thereby initially and finally expanding said sleeve in said workpiece bores, and thereby providing the preselected interference fit and bringing said enlarged head of said pin into engagement with said sleeve at said annular flange, and thereafter severing said frangible portion of said threaded section.

4,977,664

PROCESSING APPARATUS FOR PLAIN BEARINGS

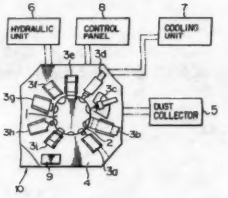
Sanae Mori, and Kosaburo Niwa, both of Nogoya, Japan, assignors to Daido Metal Company Ltd., Nagoya, Japan

Continuation of Ser. No. 230,011, Aug. 8, 1988, abandoned. This application Aug. 17, 1989, Ser. No. 395,166

Claims priority, application Japan, Aug. 21, 1987, 62-207812

Int. Cl.[5] B23Q 7/02

U.S. Cl. 29—563 **2 Claims**



1. A multi-process simultaneous processing apparatus for plane bearing workpieces to be processed, comprising:

a circular rotatable indexable coupling type table unit for delivery and having a cylindrical peripheral side wall,

a plurality of workpiece attachment positions on the circular table unit comprising plural recesses in said side wall; in circumferentially spaced relation to each other, and

working units mounted to a stationary frame facing the workpiece attachment positions,

wherein the multi-process simultaneous processing apparatus is provided for processing plain bearings as workpieces; that the table unit (1) is of the coupling type including drive means and indexing means for indexing said table; at high speed and with high accuracy; that bearing supports (2) are attached to the workpiece attachment positions for supporting plain bearings, which have the same section and the same dimensional accuracy; that the working units (3*a*–3*l*) comprise a feed/claw-extending units (3*a*), an oil groove cutting unit (3*b*), aa height finishing unit (3*d*), a relief bore working unit (3*c*), a height finishing unit (3*d*), a relief finishing unit (3*e*), a wall-thickness finishing unit (3*f*), a height/wall-thickness measuring unit (3*g*), a discharge unit (3*h*) and a cup cleaner unit (3*l*); and that also are provided a product supply unit for placing bearings in said bearing supports, a product takeout unit for removing bearings from said bearing supports, and control means for controlling the operation of said

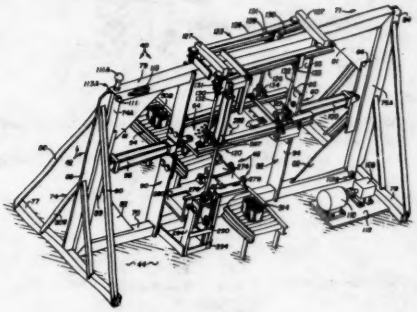
table and working units including a control panel (8) and an operating panel (9).

4,977,665

TRANSFORMER DISMANTLING SALVAGE SYSTEM

Richard J. Priest, and Richard J. Priest, Jr., both of Jacksonville, Ark., assignors to Jimelco, Inc., Jacksonville, Ark.

Filed Sep. 5, 1989, Ser. No. 403,300
Int. Cl.[5] B23P 19/04
U.S. Cl. 29—564.3 46 Claims



1. A system for dismantling used power transformers to facilitate the subsequent recovery of the internal metal constituents thereof for subsequent recycling, said system comprising:

rigid frame means adapted to be disposed upon a supporting surface;

receiving station means into which transformers to be processed are serially inputted for processing;

attack means for initially capturing transformers to be processed;

cutter means for shearing the windings of transformers to be processed; and,

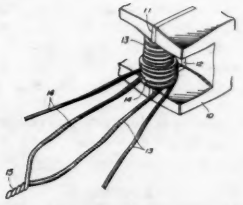
power means for selectively compressing said attack means and said cutter means together for forcibly dismantling transformers captured therebetween.

4,977,666

METHOD OF FORMING A COIL ON A CORE

Yasuyuki Suzuki, Saitama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 31, 1989, Ser. No. 387,153
Claims priority, application Japan, Aug. 15, 1988, 63-203021
Int. Cl.[5] G11B 5/42; H01F 7/06
U.S. Cl. 29—603 3 Claims



1. A method for forming a coil, comprising the steps of:

(a) inserting a first wire having an insulating coating of a first thickness into a hole of a workpiece;

(b) winding the first wire in convolution around a peripheral surface of the workpiece so that a portion of each convolution of the first wire extends through the hole; and

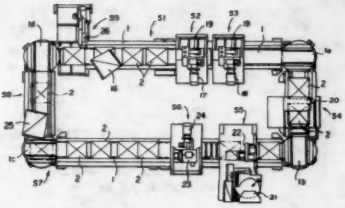
(c) continuously winding onto the convolution of the first wire and in convolutions around the peripheral surface of the workpiece a second wire having an insulating coating of a second thickness, said second thickness being smaller than said first thickness.

4,977,667

VEHICLE SUSPENSION ASSEMBLY SYSTEM

Isao Sekimoto, and Shinichi Yasui, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 28, 1989, Ser. No. 386,253
Claims priority, application Japan, Jul. 29, 1988, 63-190111; Jul. 29, 1988, 63-190112; Dec. 27, 1988, 63-330453
Int. Cl.[5] B23P 21/00
U.S. Cl. 29—784 13 Claims



1. A vehicle suspension assembly system for assembling a suspension having a shock absorber and a coil spring comprising

a pallet which is conveyed by a conveyor line and is provided with a shock absorber holding mechanism which holds the shock absorber in an upstanding state, a compressing claw means which is engaged with an upper end portion of the coil spring which has been set on the shock absorber, and a feed mechanism which moves up and down the compressing claw means and holds it in a desired position,

said conveyor line being provided with a driving mechanism which drives the feed mechanism.

4,977,668

METHOD OF MAKING SOCKET CONNECTOR

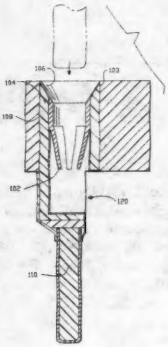
Joseph A. McKenzie, Jr., Pleasanton, Calif., assignor to McKenzie Technology, Inc., Fremont, Calif.

Filed Jan. 5, 1989, Ser. No. 293,924
Int. Cl.[5] H05K 3/00; C25D 5/10
U.S. Cl. 29—852 2 Claims

1. A method of forming a socket connector, comprising the steps of:

forming a shell assembly having a plurality of shells connected to one another, each of which is defined at least partially by a plateable plastic, each of said shells including a pin receiving hole and a lower vent area;

placing a masking means on areas of said plateable plastic between adjacent ones of said shells; and



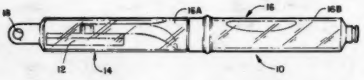
plating said plateable plastic which is exposed and uncovered by said masking means.

4,977,669

POCKET SHAVER

Ronald E. Clifford, Encinitas, Calif., assignor to Fountain Fresh, Inc., Del Mar, Calif.

Filed Jan. 24, 1990, Ser. No. 469,310
Int. Cl.[5] B26B *19/44*
U.S. Cl. 30—41 **10 Claims**



1. An improved storable personal shaver comprising:
a handle with a hollow portion and a passageway extending from said hollow portion to one end of said handle;
a shaving head pivotally attached to said one end of said handle;
a pivotal means for connecting said handle to said shaving head, said pivotal means including a vertical slot through a portion thereof which aligns with said passageway when said shaving head is rotated to a use position relative to said handle and allows communication between the outer surface of the top of said shaving head and said hollow portion and when said shaving head is rotated to a storage position communication between the hollow portion of said handle and said outer surface of the top of said shaving head is terminated.

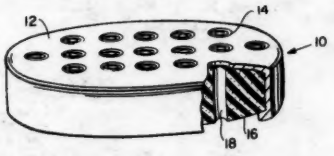
4,977,670

SHAVING IMPLEMENT

Clemens A. Iten, Fisherville, Va., assignor to American Safety Razor Company, Verona, Va.

Filed Dec. 18, 1989, Ser. No. 451,590
Int. Cl.[5] B26B *21/00*
U.S. Cl. 30—49 **19 Claims**

1. A shaving implement, comprising:
a housing having a surface with a plurality of apertures therethrough and a marginal portion of said housing about each said aperture;
a body formed of resilient material disposed within said housing;
a razor assemblage carried by said housing for disposition in each of said apertures and including in each assemblage a guard and a blade;
each said guard having an outwardly directed flange about its periphery and upper and lower surfaces;
means including said flange and said marginal portion for retaining each said guard in a corresponding aperture of



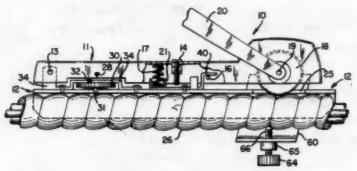
said housing with a lower surface of said guard engaging said resilient material;
said razor blade having a cutting edge about its periphery; and
means for securing said guard and said blade one to the other.

4,977,671

SAW FOR CUTTING LARGE DIAMETER SHIELDED CONDUIT

Lucien C. Ducret, 9 Tod's Driftway, Old Greenwich, Conn. 06870

Filed Oct. 25, 1988, Ser. No. 262,316
Int. Cl.[5] B21F *13/00*
U.S. Cl. 30—90.2 **28 Claims**



1. A hand tool for cutting shielded conduit comprising:
a first handle member for holding said conduit during cutting, including clamping means for securing said conduit in a fixed position relative to said first member;
a second handle member including a radial cutter head disposed thereon for cutting a portion of the shielding of conduit secured in said first member in a direction essentially parallel to the longitudinal axis of said conduit;
means for movably securing said second handle member to said first handle member including sliding support means for sliding said first handle member relative to said second handle member and means for adjusting the position of one handle member relative to the other in a direction essentially parallel to the longitudinal axis of said conduit between a plurality of different fixed positions for cutting said conduit.

4,977,672

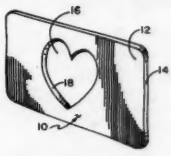
HAIR-SCULPTURING STRUCTURE AND METHOD

Paul M. Hamilton, 15 Oak Ave., West Newton, Mass. 02165

Filed May 11, 1989, Ser. No. 350,157
Int. Cl.[5] B26B *19/00, 13/00*; A45D *24/36*
U.S. Cl. 30—233 **3 Claims**

1. A template for cutting designs in hair on a person's head, comprising:
a flexible planar member having a front and back with an aperture defined therein in the desired shape of the design to be cut in the hair, said aperture surrounded by said

planar member on all sides with the inner edges of said aperture beveled inwardly from the front to the the back,



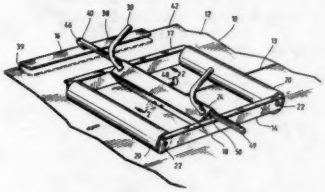
said template positioned upon the head and bent to the head's curvature with the hair that falls within the aperture in said template to be removed to the scalp by cutting.

4,977,673

ROOFING MEMBRANE

Eugene E. Altizer, Prince George, Canada, assignor to Mweld, Inc., Port Arthur, Tex.

Filed Mar. 3, 1989, Ser. No. 318,895
Int. Cl.[5] B26B *29/00*
U.S. Cl. 30—294 17 Claims



1. Apparatus for cutting a roofing membrane, comprising:

a frame having two sides and a housing mounted between and interconnecting said two sides;

said housing having first and second spaced apart plate members;

a roller rotatably mounted between said two sides and adapted to facilitate movement of said frame over said roofing membrane;

a guide member adjustably coupled to said housing for guiding said frame over said roofing membrane relative to an edge of said roofing membrane;

said guide member comprising:

an edge guide adapted to move along the edge of said roofing membrane,

a bar coupled to said edge guide and slidably received between said first and second plate members in said housing; and

means for releasably securing said bar between said first and second plate members whereby said guided member is adjustably moveable relative to said frame; and

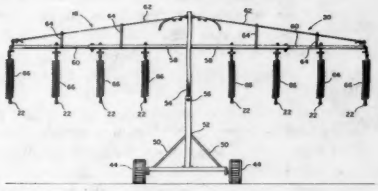
a blade mounted on said frame and adapted to cut said roofing membrane.

4,977,674

VEHICLE WITH TELESCOPIC BOOM FOR POWER DRIVEN PLANT TRIMMING TOOLS

Jacobus C. van der Merwe, and Lucas C. van der Merwe, both of 801 Beechwood Dr., Kingsport, Tenn. 37663

Continuation-in-part of Ser. No. 67,862, Jun. 30, 1987, which is a continuation-in-part of Ser. No. 886,801, Jul. 18, 1986, Pat. No. 4,694,577. This application Aug. 29, 1989, Ser. No. 399,878
The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.
Int. Cl.[5] B23D *45/20*
U.S. Cl. 30—379.5 3 Claims



1. A vehicle for supplying power to a plurality of power driven plant trimming tools, comprising:

(a) a wheeled vehicle having a pair of driving wheels mounted on a vehicle frame, at least one steered wheel rotatably mounted on the vehicle frame and pivotal about a vertical axis for steering said vehicle, an engine supported by the vehicle frame, and a power source driven by said engine for supplying said power to said power driven plant trimming tools;

(b) a telescopic arm and connector supporting structure having a pair of telescopic arms, a plurality of telescopic sections forming each said telescopic arm, each telescopic section constructed as a lattice, a hollow tube forming a part of each said lattice interconnected with hollow tubes forming a part of other lattices of said telescopic arm, an operating fluid transmission and supply connection disposed between adjacent telescopic sections for both supplying power from said power source to said power driven plant trimming tools and for fluidly interconnecting said adjacent telescopic sections; and

(c) hydraulic drive means for propelling said vehicle, said hydraulic drive means also being driven by said engine.

4,977,675

APPARATUS FOR MARKING EYEGLASS LENS BLANKS

Bryce D. Jewett, Sr., deceased, late of Richmond, Va. (by Bryce D. Jewett, Jr., executor), assignor to Rxtec, Incoporated, Richmond, Va.

Filed Apr. 12, 1989, Ser. No. 336,683
Int. Cl.[5] B43L *11/00*; G01B *1/00*
U.S. Cl. 33—028 7 Claims

1. Apparatus for marking a semi-finished ophthalmic lens blank for a subsequent blocking operation, said marking serving to indicate the optical center, cylindrical axis and optionally the prism axis of the lens, said apparatus comprising:

(a) an upright housing having upper and lower extremities, a front surface, and left and right side panels,

(b) a hollow base, upon which the lower extremity of said upright housing is mounted,

(c) track means associated with the front surface of said upright housing,

(d) a head assembly vertically positionable by slidable engagement with said track means, said head assembly being comprised of:

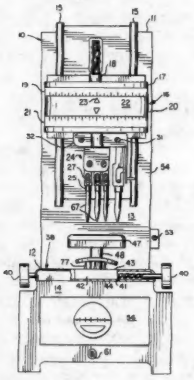
(1) first and second rotatable circular cylindrical sleeves positioned one above the other upon a common vertical center axis, each provided with a scale of angular degree markings,

(2) a set of three holders for marking pens disposed below said sleeves in side-by-side relationship, the center of said three holders being centered upon said vertical axis, the two outermost of said three holders having pivotal mobility permitting movement in divergent radial directions with respect to said center holder, said set of three holders being rotatable about said vertical axis by movement of said first sleeve,

(3) a fourth holder for marking pen mounted below said circular sleeves and adapted to travel in a circular path about said set of three holders and centered upon said vertical axis, said travel movement being coupled to said second sleeve, said forth holder having pivotal mobility permitting movement in an arc centered in a plane containing said vertical axis,

(e) a stage mounted upon said base beneath said head assembly and having controlled movability in a horizontal plane,

(f) transparent alignment means comprising a first reticle having inscribed thereupon concentric circles, and a second reticle having a series of parallel lines inscribed thereupon, said reticles being disposed one above the other in horizontal planes, and moveable with respect to each other within said planes,



(g) positioning means which dispose a lens blank above said alignment means,

(h) viewing means comprising:

(1) an illumination head located between said head assembly and stage in a resting position centered upon said vertical axis, and adapted to swing in a horizontal path away from said resting position, and

(2) a port in said base which permits viewing of an image of the lens blank in association with the alignment means,

(i) mechanical means disposed within said upright housing for moving the head assembly up and down upon said track means,

(j) mechanical means for causing swinging movement of said light reflecting means, and

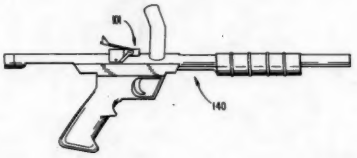
(k) electrical control means which, by way of a single activation command, cause the illumination head to swing away from its resting position, and causes downward movement of the head assembly, which effects marking of the lens blank, and returns said head assembly to the upward starting position and said illumination head to its resting position.

4,977,676

RAPIDLY ADJUSTABLE GUNSIGHT

David J. Toupin, 1717 Stricker Rd., Memphis, Ind. 47143

Filed Sep. 25, 1989, Ser. No. 412,148
Int. Cl.[5] F41G 1/06, 1/18
U.S. Cl. 33—254 11 Claims



1. A rapidly adjustable gunsight comprising

a body,

means integral with said body for attaching said body to a projectile weapon,

an elongated sight leaf having a first end and a second end, said first end of said sight leaf being pivotably attached to said body and said second end having a sight aperture,

arcuate toothed rack means coupled to said sight leaf and positioned adjacent to said sight leaf, wherein said arcuate rack is readily visibic by a person sighting through said sight aperture,

detent means mounted on said body and engaging said arcuate rack to hold said sight leaf in a preselected position, and

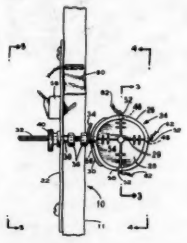
lever means coupled to said sight leaf for adjusting the position of said sight leaf.

4,977,677

TARGETING DEVICE

Robert H. Troescher, Jr., 33 Abrams Pl., Lynbrook, N.Y. 11563

Filed Nov. 20, 1989, Ser. No. 438,674
Int. Cl.[5] F41G 1/467
U.S. Cl. 33—265 8 Claims



1. A targeting device comprising:

a transparent casing having a circumferential wall

the circumferential wall having inner and outer surfaces and being formed with at least one opening,

a transparent lens having two opposite plane surfaces and a circumferential surface,

the lens being enclosed by and in firm contact with the inner surface of the circumferential wall of the casing, having its circumferential surface disposed directly opposite said opening, and having one of its plane surfaces formed with a reticle of reflective material, at least one light source, said light source being disposed in said opening,

an energy source connected to said light source, and

coating means on the casing for inhibiting light from escaping from the casing while intensifying reflection of light

from the light source into the casing between the inner and outer surfaces of said circumferential wall and then into the lens by way of said circumferential surface for illumination of the reticle.

4,977,678

ARCHERY SIGHT

Benny Sears, Rte. 2, Cleveland, Ga. 30528

Filed Jun. 27, 1989, Ser. No. 372,423
Int. Cl.[5] F41G 1/40
U.S. Cl. 33—265 5 Claims

1. For use with a bow having a frame, upper and lower limbs, a bowstring connected between the ends of said limbs and a hand grip, a sighting attachment comprising:

a longitudinal sight frame member having front and rear end portions adapted to be mounted to the bow frame to define a sighting direction;

a front bracket mounted to said sight frame member at said front end portion thereof and extending normal thereto and to said sighting direction.

a rear bracket mounted to said sight frame member at said rear end portion thereof and extending transversely thereto parallel to said front bracket,

at least two sighting pins each having a top end and being mounted to said front bracket to extend normal to said bracket and to said sighting direction, said sighting pins being oriented generally vertically when said sighting attachment is mounted to the bow frame and the bow frame is oriented vertically for use.

a sighting member having an upper edge and at least two notches in said upper edge, said sighting member being mounted to said rear bracket; and

means for selectively and independently adjusting the longitudinal positions of said sighting pins along said front bracket and for selectively and independently adjusting the lateral positions of said sighting pins relative to said front bracket, with the longitudinal adjustment of each of said sighting pins being independent of the lateral adjustment thereof.

4,977,679

AZIMUTH SIGNAL GENERATOR

Takahiro Saito, and Junichi Ito, both of Tokyo, Japan, assignors to Japan Aviation Electronics Industry Limited, Tokyo, Japan

Filed Oct. 3, 1989, Ser. No. 416,688
Claims priority, application Japan, Oct. 28, 1988, 63-274101
Int. Cl.[5] G01C 19/36, 17/28
U.S. Cl. 33—316 4 Claims

1. An azimuth signal generator comprising:

a case to be fixedly mounted on the body of a vehicle;

an inertia rotary member housed in said case, with its rotary shaft held vertically;

a drive means mounted on said case, for rotating said inertia rotary member;

a relative rotational rate detecting means for detecting the rotational rate of said inertia rotary member relative to said case to provide a relative rotational rate signal;

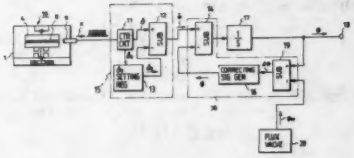
a first subtracting means supplied with said relative rotational rate signal from said relative rotational rate detecting means and a correcting signal, for subtracting said correcting signal from said relative rotational rate signal;

an integrating means for integrating the subtracted output from said first subtracting means to provide the result of integration as an azimuth signal;

a geomagnetic azimuth detecting means for producing a geomagnetic azimuth signal in accordance with an azimuth of the geomagnetism;

a second subtracting means supplied with said azimuth signal from said integrating means and said geomagnetic azimuth signal from said geomagnetic azimuth signal detecting means, for providing the difference therebetween as an error signal;

a correcting signal generating means for creating said correcting signal in accordance with said error signal from said second subtracting means and supplying said correcting signal to said first subtracting means;



said inertia rotary member having boar codes provided at equiangular intervals on its outer peripheral surface, said relative rotational rate detecting means including a bar code sensor fixedly mounted on said case in opposed relation to said outer peripheral surface of said inertia rotary member for detecting said bar codes to produce an inertia signal containing pulses corresponding to said bar codes detected, and a counting means which receives said inertia signal, counts the number of said pulses per unit time and outputs, as said relative rotational rate signal, a signal corresponding to the count value;

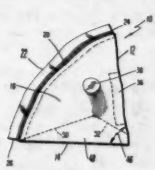
and said relative rotational rate detecting means including a setting means for initializing, as a reference value, the count value of said counting means during the steady state rotation of said inertia rotary member, and a third subtracting means for obtaining a difference between said count value of said counting means and said reference value from said setting means to obtain the difference as said relative rotational rate signal.

4,977,680

LOFT INDICATOR AND LIE DETECTOR FOR GOLF CLUB HEADS

Perry C. Marshall, 103 Granda Ct. North, Plant City, Fla. 33566

Filed May 10, 1989, Ser. No. 349,747
Int. Cl.[5] G01C 9/28
U.S. Cl. 33—508 5 Claims



1. An apparatus that indicates the degrees of loft of golf club head, comprising:

a base member having an arcuate top wall, a flat front wall, a flat backwall, a first radial wall and a second radial wall;

a permanent magnet being embedded in a preselected radial wall so that a top surface of said magnet is flush with said preselected radial wall;

an arcuate tube member fixedly secured in surmounting relation to said arcuate top wall;

said arcuate tube member being substantially filled with a liquid fluid so that an air bubble is captured therewithin;

a linear in configuration tube member rigidly secured to a preselected flat wall of said base member said linear in configuration tube member projecting perpendicularly from said base member;

said linear in configuration tube member being substantially filled with a liquid fluid so that an air bubble is captured there within;

said first and second radial walls being flat and orthogonally disposed with respect to said front wall and said back wall; and

said front and back walls of said base member being disposed in parallelism with a vertical score line formed in a face of a golf club head when said magnet releasably secures said base member to said club head.

4,977,681

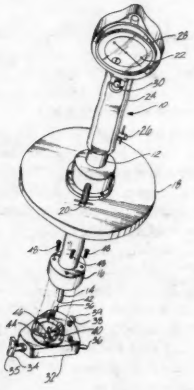
BORE GAUGE

Stephen L. Jiles, 1513 Dogwood Ave., Anaheim, Calif. 92801

Filed Feb. 13, 1989, Ser. No. 309,163

Int. Cl.[5] G01B 5/12

U.S. Cl. 33—544.5 **6 Claims**



1. A bore gage for measuring the internal diameter of a cylindrical device, including:

a hollow body portion having an axis;

a dial portion carried at the first end of said body portion;

a gaging portion carried at the opposite end of said body portion;

a rod mechanically intercoupling said dial portion and said gaging portion and carried internally to said body portion;

said gaging portion including a shoe extending at right angles to said axis of said hollow body portion and having a thickness;

first and second contact anvil assemblies each comprising a shaft and an anvil carried at one end of the respective shaft at right angles thereto, said first anvil assembly having the shaft thereof carried fixedly in said shoe at right angles to said axis of said hollow body portion, said second contact anvil assembly having the shaft thereof carried movably in said shoe and extending at right angles to said axis of said hollow body portion in alignment with said shaft of said first contact anvil assembly but in the opposite direction from said shoe;

said shafts of said first and second contact anvil assemblies each terminating at their ends remote from said shoe in a contact anvil positioned parallel to said axis of said hollow body portion and, hence, parallel to each other;

each of said contact anvils having a length greater than the thickness of said shoe and a rectilinear contact edge which assures a line contact with the inner wall of the cylindrical device being measured, such line contact being parallel to the axis of the cylindrical device being measured, the line contacts of said anvils being diametrically opposed to each other;

lever means carried pivotably by said shoe and mechanically intercoupling said rod and said shaft of said second contact anvil assembly;

spring means biasing said rod in the direction of said lever means;

said lever means being so configured and supported in said shoe that said shaft of said second contact anvil assembly moves outwardly from said shoe in response to pressure from said rod on said lever means;

said dial portion being responsive to downward motion of said rod to display an increased bore diameter reading; and,

adjustable positioning means carried by said body portion for setting the depth of said contact anvils in the device, the bore diameter of which is being measured.

4,977,682

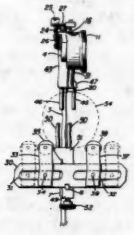
HAND HELD OVALITY GAUGE

Charles H. Allen, III, Pittsburgh, Pa., assignor to Allen Gauge & Tool Company, Pittsburgh, Pa.

Filed Feb. 10, 1989, Ser. No. 309,095

Int. Cl.[5] G01B 5/20

U.S. Cl. 33—550 **44 Claims**



1. An ovality gauge comprising:

(a) a frame including an elongated frame member and a stationary arm extending therefrom perpendicular to and connected to said elongated frame member;

(b) an elongated adjustable arm connected to and moveable along said elongated frame member and including means for locking said adjustable arm to said elongated frame member in a desired location, with said adjustable arm extending perpendicular outward from said elongated frame member from the same side as, parallel to and spaced from said stationary arm;

(c) a roller support arm connected to an end of one of said stationary arm or adjustable arm opposite said elongated frame member and extending perpendicular thereto and to a plane parallel to said adjustable arm, frame member and stationary arm;

(d) a pair of rollers rotatably mounted to said roller support arm and spaced apart from each other;

(e) indicator means mounted to the other of said stationary arm or adjustable arm and having a moveable contact connected thereto, whereby movement of said moveable contact is detected by said indicator means, with said moveable contact and said pair of rollers aligned with one another in a plane extending perpendicular to said station-

ary arm and said adjustable arm and parallel to said elongated frame; and

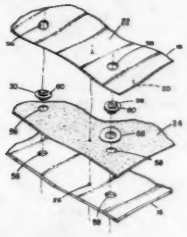
(f) means on said roller support arm for varying the spacing between said pair of rollers.

4,977,683

IMAGE CONTROL BOARD

Willard J. Harder, Eden Prairie, Minn., assignor to Ternes Register Systems, St. Paul, Minn.

Filed Mar. 9, 1989, Ser. No. 321,570
Int. Cl.[5] G03B 27/20
U.S. Cl. 33—621 15 Claims



1. A board providing precise registration and alignment of a plurality of planar work pieces each having a plurality of registration holes therein comprising:

a planar board member;

a plurality of pins mounted on said board and projecting from said board along a pin axis perpendicular to said board, said pins adapted to be received within the registration holes of the work pieces;

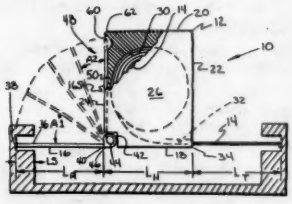
rigid mounting means for securing at least one of said pins for multidirectional movement in the plane of the board member while retaining said pin axis perpendicular to said board to ensure registration and alignment of the multiple work pieces with respect to each other.

4,977,684

APPARATUS AND METHOD FOR MEASURING LENGTH WITH A TAPE AND A RULE

Loren Mosman, 1235 SW. Second St., Wadena, Minn. 56482

Filed Dec. 27, 1988, Ser. No. 290,764
Int. Cl.[5] G01B 3/10, 3/06
U.S. Cl. 33—766 10 Claims



1. A linear measuring device comprising

(a) a tape housing having an exterior perimeter with a tape outlet;

(b) a flexible measuring tape normally stored in a spiral configuration within the housing, said tape being extractable from the housing and returnable into the housing through the tape outlet;

(c) a rigid rule movably secured to the housing independently of the tape, said rule being deployable in a direction projecting at least 90 degrees divergent from the extracted portion of the flexible tape;

(d) rule storing means in said housing for normally storing the entire length of said rule compliantly upon said housing perimeter; and in which

(1) said housing is generally rectangular and has a pair of opposed sides with the said tape outlet being in a first of said opposed sides, said rule storing means being on the second of said opposed sides;

(2) said tape outlet is on a base corner of said first opposed side, and including a fastener in a base corner of said second side securing said rigid rule to said second side base corner;

(3) said rigid rule has a deployed length of extension normal to and from said second side which is equal in length to the distance between said base corners; and

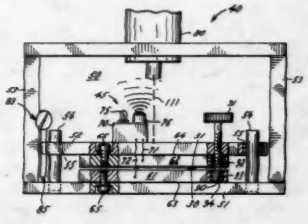
(4) the entire length of the rigid rule nests within one side of the housing.

4,977,685

PLANAR THICKNESS GAUGE

Farrokh Shahlapour, 1853 N. Neva, Chicago, Ill. 60635

Filed Jul. 24, 1989, Ser. No. 383,661
Int. Cl.[5] G01B 7/02
U.S. Cl. 33—783 21 Claims



1. A planar thickness gauge for a conductive planar workpiece of predetermined nominal thickness, the workpiece being an electrical conductor, the gauge tester comprising the combination of:

a base plate including a first planar electrical contact for supporting the workpiece over a substantial portion of its planar area,

a thickness measuring platen including a second planar electrical contact,

the planar electrical contacts being mounted generally parallel to each other, means for relatively displacing the electrical contacts in parallelism to encompass a workpiece disposed on the base plate, guide means for interconnecting the base plate and platen for assuring parallel displacement of the planar electrical contacts with respect to each other,

an electrical circuit including the first and second planar electrical contacts to be completed by the workpiece when both of said contacts are in contact with the workpiece, the electrical circuit including means for initiating a measurement of the gap between the electrical contacts upon completion of the electrical circuit as a measure of the planar thickness of the workpiece.

4,977,686

METHOD FOR PROCESSING ROUGH TIMBER

György Erdösi; László Bálint, and Péter Osváth, all of Budapest, Hungary, assignors to Top-Coop Idegenforgalmi és Vendéglátóipari Kisszövetkezet, Budapest, Hungary

PCT No. PCT/HU88/00023, § 371 Date Feb. 7, 1989, § 102(e) Date Feb. 7, 1989, PCT Pub. No. WO88/08780, PCT Pub. Date Nov. 17, 1988

PCT Filed Apr. 20, 1988, Ser. No. 300,065

Claims priority, application Hungary, May 4, 1987, 1983/87

Int. Cl.[5] F26B *3/00*

U.S. Cl. 34—9.5 **10 Claims**

1. A method for drying timber, which comprises drying substantially unseasoned timber in a kiln while spraying into the kiln at least once a mixture of nitric acid and an effective amount of an aqueous solution of an alkali earth metal salt, whereby the pectin of the wood fiber which normally blocks the evaporation of moisture from therebetween will become loosened to permit evaporation of the water content of the wood, and said alkali earth metal is incorporated in the wood fiber.

4,977,687

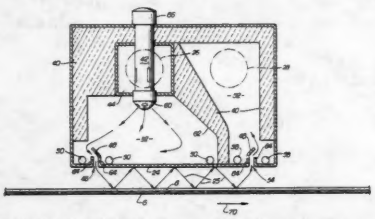
DRIP FREE STEAMBOX

Mathew G. Boissevain, Los Altos, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Aug. 3, 1988, Ser. No. 227,996

Int. Cl.[5] F26B *21/06*

U.S. Cl. 34—51 **25 Claims**



1. A device for directing a flow of condensable gas toward a moving sheet surface, comprising:

a chamber for containing the condensable gas, the chamber having a wall means adapted to oppose the sheet surface and a gas exit slot having a length extending across the wall means, wherein the wall means is in close proximity to the sheet surface for a sufficient distance in the direction of sheet movement so that the condensable gas not immediately absorbed by the sheet is deflected back and forth between the sheet surface and the wall means as the condensable gas moves downstream in the direction of sheet movement;

a valve associated with the chamber for selectively controlling the flow of the condensable gas into the chamber; and

dam means located downstream from the valve for substantially preventing condensate from dripping out of the chamber.

4,977,688

VAPOR DEVICE AND METHOD FOR DRYING ARTICLES SUCH AS SEMICONDUCTOR WAFERS WITH SUBSTANCES SUCH AS ISOPROPYL ALCOHOL

Glenn A. Roberson, Jr., Hollister, and Robert B. Eglinton, Montery, both of Calif., assignors to Semifab Incorporated, Hollister, Calif.

Filed Oct. 27, 1989, Ser. No. 427,512

Int. Cl.[5] F26B *13/30*

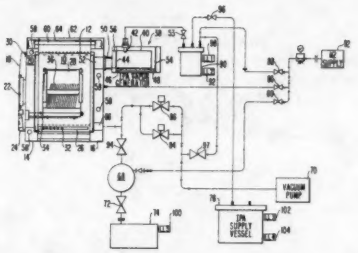
U.S. Cl. 34—92 **30 Claims**

1. A device for drying articles, comprising:

a vacuum process chamber for holding articles to be dried and for maintaining a sub-atmospheric pressure environment;

vapor generating means substantially isolated from said process chamber for supplying a substance in vapor form to said process chamber;

means disposed proximate said process chamber for discouraging said substance vapor from condensing on the inside walls of said process chamber, and heating means for aiding in the vaporizing of liquid molecules from the articles.



4,977,689

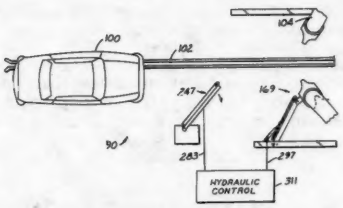
SIDE NOZZLE TRACER SYSTEM

James A. Belanger; Robert J. Wentworth, both of Northville, and Graham J. Astley, Novi, all of Mich., assignors to Belanger, Inc., Northville, Mich.

Filed Jul. 26, 1989, Ser. No. 385,031

Int. Cl.[5] F26B *19/00*

U.S. Cl. 34—243 C **14 Claims**



1. A system for accurately positioning an accessory in a car wash system including:

a track guiding a conveyed automobile along a path;

a mechanical abutment normally positioned within the path of the conveyed automobile and being movable away from the conveyed automobile by contact with the conveyed automobile;

an accessory positioned alongside the path of the automobile and performing some accessory function in the car wash system; and

said mechanical abutment means communicating through a hydraulic control with said accessory to accurately position said accessory with respect to the individual width of the individual automobile by positioning said accessory to reflect the exact movement of said mechanical abutment by the conveyed automobile.

4,977,690

DRIER WITH BLOWER MOTOR-HEATED AIR AND FLOW RECIRCULATION

Albert H. Davis, Jr., 541 Proctor Ave., Scottdale, Ga. 30079

Filed Aug. 3, 1989, Ser. No. 389,342

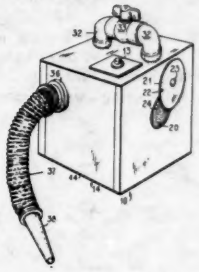
Int. Cl.[5] F26B *19/00*

U.S. Cl. 34—243 R **6 Claims**

4. A hair drier for use with animals which comprises:

(a) at least one motor-fan unit having a fan and motor through which air from the fan can flow;

(b) an enclosure having at least one exterior wall and a barrier, the enclosure and the barrier forming first and second chambers, inlet and outlet sides of the motor-fan unit being disposed in the first and second chambers, respectively; and



(c) means, including at least one pipe fluidly connecting the first and second chambers, for recirculating air from the second chamber back into the first chamber, the only air being recirculated being air which as yet to be discharged from an opening in the exterior wall for application to said animals.

4,977,691

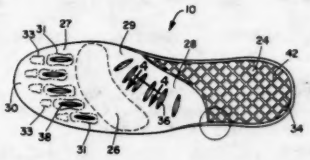
SHOE INSOLE WITH BOTTOM SURFACE COMPRESSION RELIEF

Lewis P. Orchard, 3rd, Seal Beach, Calif., assignor to Spenco Medical Corporation, Waco, Tex.

Continuation-in-part of Ser. No. 236,077, Aug. 23, 1988, abandoned. This application Jan. 31, 1989, Ser. No. 304,755

Int. Cl.[5] A43B *13/38, 13/40, 23/08*

U.S. Cl. 36—44 **19 Claims**



1. A shoe insole comprising a first upper layer, said first upper layer comprising a liner suitable for disposition toward a user's foot, and a second lower layer of visco-elastic material, said second layer having the ability to flow, upon exertion of force thereon, said second layer comprising a heel portion corresponding to the heel area of a user's foot, a ball area corresponding to the ball area of a user's foot, an arch area corresponding to the arch area of a user's foot, and a toe area corresponding to the end portions of a user's toes, said second layer having a lower exterior surface, said lower exterior surface having recesses in at least one relief area adjacent said ball area, said ball area being functionally devoid of said recesses.

4,977,692

RETENTION DEVICE FOR SKI BOOT

Shinichi Iwama; Keiji Tsugami, and Shigeto Yamada, all of Tokyo, Japan, assignors to Daiwa Seiko, Inc., Tokyo, Japan

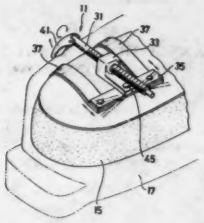
Filed Jul. 21, 1989, Ser. No. 383,401

Claims priority, application Japan, Aug. 4, 1988, 63-194926

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—119 **6 Claims**

1. Ski boots formed by being provided with an outer shell and an inner boot fitted into it, comprising an adjusting bolt within the fore part of the instep of said outer shell to be freely turnable externally, a moving member connected to the adjusting bolt, there being between said outer shell and said inner boot a plurality of pressing bands which are flexible and press the fore part of the foot instep in the width direction of the instep, one end of each of the pressing bands being fixed to said outer shell, the other end of each of the pressing bands being coupled to said moving member, wherein about a central



portion of a rocking member having two ends is rotatably attached to the above moving member, one end of each of the above plurality of pressing bands being rotatably attached to the rocking member at a predetermined distance from the other pressing band ends and the other end of each of the bands being fixed spacedly relative to each other to the outer shell at a predetermined distance from the rocking member, one said pressing band being rotatable attached at each of said rocking member ends.

4,977,693

DEVICE FOR DAMPING AND LIMITING THE TILTING ACTION OF THE CUFF RELATIVE TO THE SHELL OF A SKI BOOT

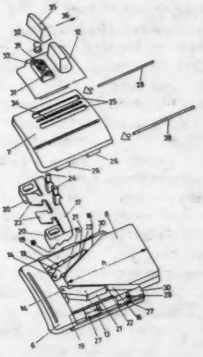
Horst Bischof, Graz, and Gerhard Trinkaus, Baernbach, both of Austria, assignors to Koflach Sport Gesellschaft mbH & Co. KG, Voecklabruck, Austria

Filed Nov. 30, 1988, Ser. No. 277,947

Claims priority, application Austria, Dec. 1, 1987, 3158/87

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—120 **6 Claims**



1. In a device for use with a ski boot, comprising:

a shell covering at least the instep region of the foot;

a cuff part tiltably attached to said shell;

damping means situated between said shell and said cuff part for limiting and controlling the tilting motion of said cuff part, wherein said damping means is further comprised of a generally triangularly shaped body with mutually convergent lateral surfaces molded from an elastomeric material wherein the geometric height of said body

extends along the lengthwise central plane of the boot with the narrower end thereof oriented in the direction of the toe of the boot;

a housing located on said shell for receiving said body; the improvement comprising

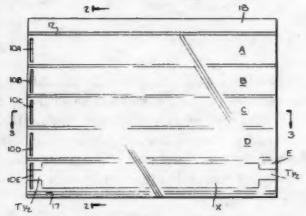
adjustable lateral stop means connected to said housing for locking said body in an adjustable and selectable position by cooperation with the mutually convergent lateral surfaces of said body.

4,977,694

MULTI-CHANNEL TRANSPARENT JACKET FOR MICROFILM STRIPS HAVING NOTCHED DUMMY STRIP

Isidore Dorman, Whitestone, N.Y., assignor to NB Jackets de Puerto Rico

Filed Nov. 18, 1985, Ser. No. 798,874
Int. Cl.[5] A47G 1/06; G09F 1/10
U.S. Cl. 40—159 **3 Claims**



1. A multi-channel transparent jacket adapted to be loaded with strips of microfilm to create a reproducible microfiche master, the jacket comprising:

A. transparent top and bottom panels in superposed relation;

B. a plurality of spacer ribs in parallel relation sandwiched between the panels and bonded thereto to define parallel channels loadable with said microfilm strips, said channels each having a transverse entry slot adjacent one end thereof to permit insertion into the channels of a microfilm strip, the width of each channel being slightly larger than the width of the strips for which the jacket is intended, the ribs having a thickness which is close to the thickness of said strips whereby the strips are, when inserted in said channels, snugly held therein; and

C. a removable blank dummy strip formed of opaque, relatively stiff, flexible plastic material pre-loading the lowermost channel in the jacket to effect stiffening thereof, such that when the other channels are thereafter more or less loaded with said microfilm strips beginning with the uppermost channel to create a microfiche master which can be included in a stack of jackets stored in a file drawer and will not buckle or slide under in the drawer, said dummy strip having a relatively narrow tongue at at least one end thereof which underlies said slot but does not interfere with the later insertion of a film strip into the slot to displace the dummy strip, said dummy strip having a width and thickness approximately equal to that of a microfilm strip for which the jacket is intended.

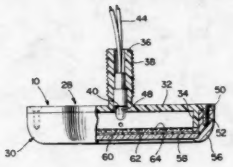
4,977,695

ILLUMINATED MEDALLION

Joseph M. Armbruster, 2700 NE. 47th St., Lighthouse Point, Fla. 33064

Filed Dec. 15, 1987, Ser. No. 133,345
Int. Cl.[5] G09F 13/00
U.S. Cl. 40—541 **7 Claims**

1. An illuminated medallion comprising a backing plate assembly, a lens assembly mounted on said backing plate assembly and means for supporting the backing plate assembly from a supporting structure, said backing plate assembly comprising a flat, thin, circular backing plate having generally planar surfaces, a projection on said backing plate in the form of a cylindrical flange extending perpendicular to one planar surface with the flange being concentric with the backing plate and spaced inwardly from but adjacent to the peripheral edge thereof, said means for mounting the backing plate assembly including a tubular threaded stud having a diameter substantially less than the backing plate and located centrally and rigidly with respect the backing plate and being aligned with a central opening in the backing plate and extending perpendicular to the other planar surface, said opening having a diameter substantially less than the inside diameter of the flange, said stud being externally threaded for engagement with a supporting structure, electrical wires extending into said stud, a bulb socket and bulb connected with the wires with the bulb socket being disposed in the tubular stud, said bulb projecting from the opening in the backing plate, said lens assembly including a transparent lens and a coating with indicia on the inner surface thereof and a diffuser disc for diffusion of the light from the light bulb for illumination by the diffused light passing through the lens assembly to enable the indicia to be observed externally of the medallion.

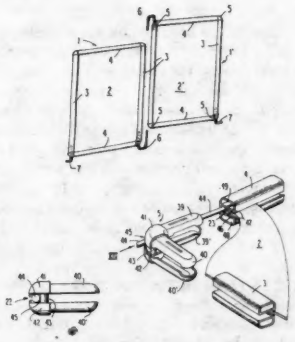


4,977,696

DISPLAY RACK

Gert A. Johansson, Engelbrektsgatan 57, S-412 52 Göteborg, Sweden

PCT No. PCT/SE87/00178, § 371 Date Oct. 21, 1988, § 102(e) Date Oct. 21, 1988, PCT Pub. No. WO87/06754, PCT Pub. Date Nov. 5, 1987
PCT Filed Apr. 8, 1987, Ser. No. 264,642
Claims priority, application Sweden, Apr. 21, 1986, 8601822
Int. Cl.[5] G09F 7/00
U.S. Cl. 40—605 **12 Claims**



1. Display rack comprising a plurality of display frames enclosing flat panes and interconnected by coupling members, each display frame comprising frame side members and corner pieces interconnecting adjacent ends of said side members, said

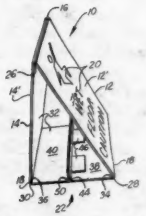
frame members being extruded profiles having a constant cross-section over the entire length thereof including two parallel tube portions interconnected by a bridge portion and having between said tube portions two longitudinal grooves, said grooves having openings in opposite directions and the bridge portion being located mainly in the plane of the completed display rack, said corner pieces having at least two pairs of mutually perpendicular legs, the legs of each pair being mutually parallel and inserted into said tube portions of the frame side members under friction, the improvement wherein at least one externally located longitudinal groove of each display frame has a longitudinal axis, is recessed having said outwardly facing opening along the entire length of the groove and being narrower than the rest of the groove, a dowel member of each of said coupling member positioned within the groove and including a portion preventing said dowel member from being forced out of the groove transversely to the longitudinal axis thereof, said corner pieces being formed with cavities constituting extensions of the recessed grooves of the frame side members with the dowel members passing without any obstacle through the corner pieces and into said recessed grooves, and wherein each coupling member comprises at least two said dowel members, each of which is introduced through one of the cavities of a corner piece and projected further into the corresponding recessed groove in a frame side member to interconnect at least two adjacent display frames at a given corner of said display rack.

4,977,697

FOLDABLE TRAFFIC BARRIER

Raymond M. Genick, 5030 Auburn Rd., Utica, Mich. 48087

Filed Jun. 1, 1990, Ser. No. 532,056
Int. Cl.[5] G09F *15/00*
U.S. Cl. 40—606 **9 Claims**



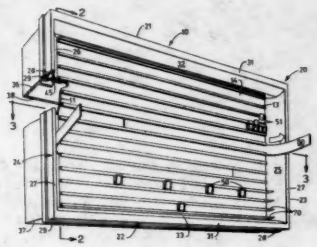
1. A foldable traffic barrier comprising:
a first message panel having a first end and a second end;
a second message panel having a first end and a second end, said first end of said second message panel being foldably connected to said first end of said first message panel, the foldable connection of said first message panel to said second message panel defining an apex;
a first bottom panel having a first end and a second end, said first end of said first bottom panel being foldably connected to said second end of said first message panel;
a second bottom panel having a first end and a second end, said first end of said second bottom panel being foldably connected to said second end of said second message panel;
a first flange foldably connected to said second end of said first bottom panel;
at least one first die cut in said first flange defining at least one tab, said at least one first die cut in said first flange being located adjacent said second end of said first bottom panel;
a second flange foldably connected to said second end of said second bottom panel; and
at least one second die cut in said second flange defining at least one slot, said at least one second die cut in said second flange being located adjacent said second end of said second bottom panel;
whereby said at least one tab may be selectively inserted into said at least one slot until each of said first and second flanges mutually contact, thereby causing said first message panel and said second message panel to mutually assume an A-frame shape.

4,977,698

DISPLAY SIGN SYSTEM

Patrick J. Seggerson, Villa Hills, Ky., assignor to Dealite, Inc., Williamsburg, Ohio

Filed Jun. 12, 1989, Ser. No. 365,242
Int. Cl.[5] G09F *13/04*
U.S. Cl. 40—618 **15 Claims**



1. An improved display sign system, said system comprising:
(a) a sign face having oppositely disposed lateral side edges;
(b) a plurality of vertically spaced longitudinal ribs defining at least one longitudinal track disposed on said sign face, said track having lateral edges adjacent said side edges and designed to support indicia elements within said track adjacent said sign face; and
(c) at least one side frame member located adjacent a lateral side of said sign face, said frame member comprising a curved surface which is substantially flush with the sign face at said lateral side of said face, and which extends outwardly and away from the lateral side to provide a guide for inserting indicia elements into a lateral edge of a longitudinal track from the front side edge of said sign face.

4,977,699

BAITING METHOD AND DEVICE

James D. Mannix, 8324 Panorama Ridge Ct., Spring Valley, Calif. 92077

Continuation-in-part of Ser. No. 319,118, Mar. 6, 1989, abandoned. This application Jan. 16, 1990, Ser. No. 465,318
Int. Cl.[5] A01K *97/00*
U.S. Cl. 43—4 **7 Claims**

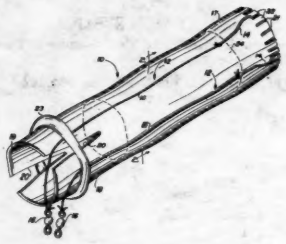
1. A kit, for attaching a bait to a fishing line hook, said hook including a generally straight shank portion having an end adapted for attachment to a fishing line, wherein said kit comprises:
said hook;
a line leader comprising a length of line attached at one end to said hook; and
an awl consisting of a generally elongated member having a pointed end at one extremity and a notch cut through part of a thickness of said member proximate an end opposite said pointed end.

4,977,700

CARRIER FOR FISHING LEADERS

Robert D. Perlman, 2002 Deaver, Fort Lauderdale, Fla. 33326, and Jose Pelaez, 471 NW. 132nd Pl., Miami, Fla. 33182

Filed Oct. 30, 1989, Ser. No. 428,599
Int. Cl.[5] A01K 97/00
U.S. Cl. 43—57.2 5 Claims



1. Apparatus for releasably retaining a plurality of fishing leaders, each having an end with a hook, a length of line connected to the hook and a free end, said apparatus comprising:

an elongated body member having a longitudinally extending smooth external cylindrical surface and a cavity with an opening onto said surface;

means on said body member surface for receiving the hooks of the leaders; and

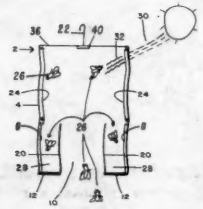
means on said surface, longitudinally spaced from said hook receiving means and disposed transversely across a midportion of said cavity opening, for frictionally clamping the free ends of the leaders against said surface when the hooks are received by said hook receiving means and the lines of the leaders are respectively drawn longitudinally out through said cavity and respectively moved transversely from said cavity onto said surface; and said opening defining means for individually releasing said leader free ends from said clamping action when the leader lines are respectively moved transversely back to said cavity.

4,977,701

TAMPER RESISTANT FLYING INSECT CONTROL DEVICE

Daniel A. Sherman, 1355 Bobolink Pl., Los Angeles, Calif. 90069

Filed Nov. 20, 1989, Ser. No. 438,192
Int. Cl.[5] A01M 1/02
U.S. Cl. 43—122 4 Claims



1. A Tamper-Resistant Flying Insect Control Device; said device being constructed of an exterior tube having an interior tube wall; said tube being closed at one end with an opening at the opposing end; said opening at the opposing end having a partial closure; said partial closure having an interior tubular structure extending upward from said end partial closure extending part way into the interior of said exterior tube; said upward interior tube forming a trough in relationship with said partial end opening and said exterior tube wall; said interior tube wall having been coated with a solid insecticidal substance to a height that will allow insects to come into contact with said insecticidal substance but will not allow a person reaching in through said interior tube to come into contact with said insecticide; said trough forming a well into which dead insects will fall and be collected.

4,977,702

PROCESS FOR GROWING PLEUROTUS

J. André Fortin, Neufchatel, and Laurence Thomas, Quebec, both of Canada, assignors to Universite Laval, Quebec, Canada

Filed Apr. 26, 1989, Ser. No. 343,352
Int. Cl.[5] A01G 1/04
U.S. Cl. 47—1.1 4 Claims

1. A method for the production of edible mushrooms selected from Pleurotus and Volvaria (straw mushroom) and which comprises:

(a) pasteurizing in two stages a nutrient substrate packaged in a heat-resistant plastic container provided with a number of gas exchange membranes impervious to outside microorganism, wherein the first pasteurization stage is effected at a range of temperature between 50° to 55° C. for a period of about 5 hours under vapor pressure and renewed air flow, followed by a cooling period of about 10 hours and the second pasteurization stage is effected at a range of temperature between 70° C. to 80° C. for a period of about 2 hours under vapor pressure and renewed air flow

(b) inoculating the pasteurized nutrient substrate obtained with a hyphal cell suspension of edible mushrooms selected from Pleurotus and Volvaria produced by a liquid fermentation;

(c) incubating the inoculated nutrient substrate obtained;

(d) removing the gas exchange membranes from the surface of the container after the appearance of fruit body primordia; and

(e) collecting the edible mushrooms at maturity.

4,977,703

PLANT SOIL PROTECTOR

Chris Blanc, 6569 Chantry St., Orlando, Fla. 32811

Filed Jan. 30, 1990, Ser. No. 472,071
Int. Cl.[5] A01G 9/02
U.S. Cl. 47—84 9 Claims

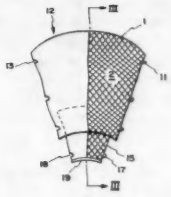
1. An improved plant soil protector for protecting a plant contained within a soil filled pot having a peripheral rim, comprising:

(a) a plurality of segments, each said segment made of a grid material to permit passage of air and water therethrough, each segment further including:

(i) means to removably attach a segment to an adjacent segment such that said segments when attached together substantially cover said soil, said segments, when attached together, combining to form a central opening

adapted to surround said plant when said protector is placed in overlying relation to said soil;

(ii) means to enlarge each respective said segment such that each said segment may cover a larger area of soil,



said plurality of segments thereby being adapted to protect differing sized potted plants and soil thereabout; and

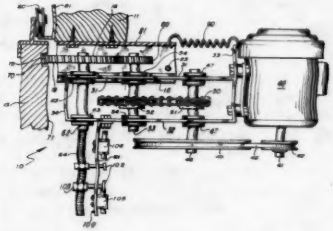
(iii) each said segment having attachment means for removably attaching said segments on said pot.

4,977,704

MACHINE SHED SLIDING DOOR OPERATOR

Gordon K. Koenig, 10540 11th Ave. N.E., Rochester, Minn. 55904

Filed Apr. 23, 1990, Ser. No. 511,731
Int. Cl.[5] E05F 11/34
U.S. Cl. 49—362 10 Claims



1. A door operator for opening a sliding door of a structure comprising

a stationary frame for being affixed to the structure,

door operating means for opening and closing the sliding door and being mounted on the frame and transversely slidable relative the door,

engaging means affixed in the door for engaging and cooperating with the door operating means, and

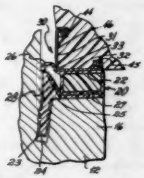
resilient means affixed between the frame and the door operating means for continuously biasing the door operating means against the engaging means whereby the door operating means continuously brings pressure to bear against the engaging means when the door is wind driven inwardly or outwardly relative to the structure.

4,977,705

EXTERIOR DOOR CONSTRUCTION

Norbert J. Guetle, Jr., Cincinnati, Ohio, assignor to Pease Industries, Inc., Fairfield, Ohio

Continuation of Ser. No. 268,096, Nov. 7, 1988, Continuation-in-part of Ser. No. 143,543, Jan. 13, 1988, abandoned. This application Mar. 16, 1990, Ser. No. 494,611
The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.
Int. Cl.[5] E06B 7/232
U.S. Cl. 49—478 35 Claims



1. A door for hinged mounting in a frame including a lock side jamb, a hinge side jamb, a top jamb and a sill cooperating to define a door opening, each of said jambs including a stop establishing the closed position of a door mounted in said frame, and at least said lock side jamb being provided with magnetic weather stripping mounted to overlie said stop portion thereof,

(a) said door having at least the peripheral portion of the lock side edge made of non-magnetic material,

(b) said door having a face designated for engagement with said stops,

(c) a trim strip of magnetic material and having in cross-section a substantially L-shaped configuration,

(d) flange means extending along each outer edge of said trim strip for holding said trim strip to said door, and

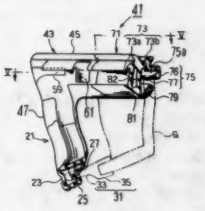
(e) a vertical groove in each of the door lock side edge and the door face positioned to receive said flange means therein such that as said trim strip is pressed against the vertical corner of said lock side edge and the face of the door, said flange means clip-in to said vertical grooves and hold the trim strip in enclosing relation with said vertical corner for magnetically sealing engagement with said weather stripping in the closed position of said door.

4,977,706

WEATHER STRIP

Hisayuki Kisanuki, Aichi, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jul. 19, 1989, Ser. No. 381,983
Claims priority, application Japan, Jul. 29, 1988, 63-191817
Int. Cl.[5] E06B 7/16
U.S. Cl. 49—479 10 Claims



1. A weather strip for vehicles, comprising:

(a) a straight portion;

(b) a corner portion having a bent shape and connected to said straight portion, said corner portion including a lateral piece connected to a longitudinal piece, a tortuous hollow portion being formed in at least one of said lateral piece and said longitudinal piece;

means defining a core drawing hole in a surface of said corner portion for drawing a core which forms said hollow portion, and

means defining a slit at a predetermined location on a circumferential edge of said core drawing hole, whereby the core drawing hole can be easily widened when said core is drawn.

4,977,707

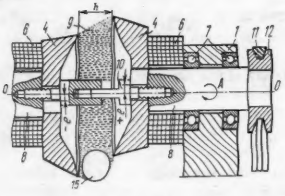
DEVICE FOR EXTERNAL MAGNETIC ABRASIVE MACHINING OF CYLINDRIGAL COMPONENTS

Viktor N. Chachin, ulitsa Kulman, 15, kv. 91; Nikolai S. Khomich, ulitsa Karbysheva, 11, kv. 10, both of Minsk; Lel K. Druzhinin, 1 Peschany pereulok, 4, kv. 326, Moscow; Igor A. Shlepov, ulitsa Vershinina, 4, kv. 2, Moscow; Rostislav O. Dulgier, ulitsa Chernyakhovskogo, 9 korpus 3, kv. 260, Moscow; Boris A. Steblovsky, Volgogradskaya ulitsa 9, kv. 57, Kiev; Viktor P. Budnik, ulitsa Gogolya, 58, kv. 179, Kievskaya oblasti Boyarka; Nikolai P. Morozov, ulitsa Korsh-Sablina, 24, kv. 2, Minsk; Vitaly V. Babuk, 2 pereulok Bagrationa, 19, kv. 343, Minsk, and Alexandr P. Tarun, ulitsa Kiseleva, 7, kv. 3, Minsk, all of U.S.S.R.

Filed Jan. 5, 1989, Ser. No. 382,621

Int. Cl.[5] B21B *45/04*

U.S. Cl. 51—18 1 Claim



1. A device for external magnetic abrasive machining of cylindrical components comprising an electromagnetic system incorporating a pair (2) of pole pieces (4) mounted opposite each other so as to form an annular working zone (9), and a mechanism (16) for feeding the component longitudinally into the working zone CHARACTERIZED in that the electromagnetic system is provided with an additional pair (3) of pole pieces (5) mounted opposite the first pair (2) and displaced with respect to the latter, lengthwise a longitudinal axis (O_1—O_1) of a component (15) to be machined, for a distance $L=(0.2 \text{ to } 1.0)D$, where D is the diameter of the pole pieces (4,5), said pole pieces (4,5) in each of the pairs (2,3) being kinematically associated with each other, set on a common axis of rotation (O—O) and featuring an oppositely directed eccentricity (e) with respect to that axis.

4,977,708

PORTABLE HANDHELD TOOL MACHINE HAVING A TENSIONING DEVICE FOR A BELT DRIVE

Manfred Kloft, Waiblingen-Hegnach, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Dec. 11, 1989, Ser. No. 448,267

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1988, 3841644

Int. Cl.[5] B24B *23/00, 21/20;* F16H *7/12, 7/22*

U.S. Cl. 51—170 R 11 Claims

1. A portable handheld tool machine such as a grinding machine or cutting and grinding machine for rotatively driving a disc-shaped cutting or grinding tool, the portable handheld tool machine comprising:

a housing;

a first component defining a first longitudinal axis and having an output spindle rotatably mounted thereon for accommodating the tool;

a second component defining a second longitudinal axis and being mounted on said housing;

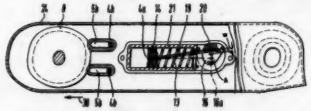
said first component being mounted on said second component to define an arm therewith extending axially in the direction of said axes and so as to be displaceable relative to said second component in the direction of said axes;

said second component having a drive wheel rotatably mounted thereon;

a belt arranged between said drive wheel and said output spindle for transmitting a belt drive force from said drive wheel to said output spindle for rotatively driving the tool;

tensioning means for providing a tensioning force which acts on said components for adjusting the tension in said belt so as to permit a reliable transmission of said belt drive force to said output spindle;

said tensioning means including: a pressure piece for imparting said tensioning force to said first component; and, resilient biasing means for providing said tensioning force between said second component and said pressure piece;



setting means operatively connected to said tensioning means and including: a rotary knob defining a rotational axis and being rotatably journalled in said second component; and, a pull rod for connecting said rotary knob to said pressure piece;

said rotary knob being rotatable between a first rotational position wherein said knob acts on said pressure piece via said pull rod to hold said pressure piece in an inactive position wherein said tensioning force of said resilient biasing means is blocked from acting on said first component and a second rotational position wherein said knob acts via said pull rod on said pressure piece for releasing said pressure piece into an active position wherein said resilient biasing means acts through said pressure piece to impart said tensioning force to said first component;

said pull rod being connected to said rotary knob so as to cause said pull rod to lie on one side of said rotational axis when said pressure piece is in said inactive position and so as to cause said pull rod to lie on the other side of said rotational axis when said pressure piece is in said active position; and,

stop means for holding said pull rod on said one side of said rotational axis under the force of said resilient biasing means when said pull rod is on said one side of said rotational axis.

4,977,709

ABRASIVE WHEEL

Jan Siden, Skelleftea, Sweden, assignor to Inovac AB, Skelleftea, Sweden

Filed May 19, 1989, Ser. No. 354,414

Int. Cl.[5] B24D *5/00*

U.S. Cl. 51—206 R 2 Claims

1. An abrasive wheel for grinding a tip of a hard metal pin of a button-studded drilling bit, to an obtusely profiled shape in an annular tapered band having an axially outer, smaller diameter and an axially inner, larger diameter, in a grinding machine having:

a rotatable holder in which the hard metal pin is disposed at a grinding position and rotated about a holder rotational axis for rotating the hard metal pin while the tip of the hard metal pin is being ground by an abrasive wheel; and

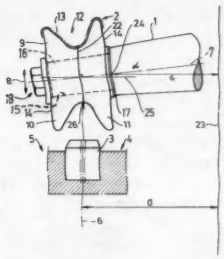
a driven spindle on which, in use, the abrasive wheel is disposed at a grinding position and rotated about a spindle rotational axis for rotating the abrasive wheel while the tip of the hard metal pin is being ground by the abrasive wheel;

at least one of the holder and spindle being linearly reversibly movable along said spindle rotational axis, in a plane containing both said rotational axes;

the spindle rotational axis being inclined from perpendicularity to the holder rotational axis, by an acute angle α;

said abrasive wheel comprising:

a body which is rotationally symmetrical about an abrasive wheel rotational axis which, in use, coincides with said spindle rotational axis, said body including two circumferentially extending, radially outwardly projecting flange portions which sandwich between them a circumferentially extending, radially outwardly opening groove portion;



said groove portion having a surface profile which, in longitudinal cross-section of said abrasive wheel, is symmetrical about a line of symmetry which intersects said abrasive wheel rotational axis at an angle which is equal in magnitude to said angle α;

said surface profile including a radially innermost base segment, two axially opposite radially outer segments having respective radially outer ends, and two axially opposite intermediate segments extending between axially opposite ends of said base segment and respective ones of said radially outer segments; said surface profile being radially outwardly generally concave and flaring in width from said axially opposite ends of said base segment towards said radially outer ends of said radially outer segments; said base segment being shorter transversally of said line of symmetry than the magnitude of said axially outer, smaller diameter of said obtusely profiled shape of said hard metal pin, and said two radially outer ends of said radially outer segments of said surface profile being located further apart transversally of said line of symmetry, than the magnitude of said axially inner, larger diameter of said obtusely profile shape of said hard metal pin.

4,977,710

METAL BONDED DIAMOND WHEEL

Kouji Une, Kawasaki, Japan, assignor to Asahi Diamond Industrial Co., Ltd., Tokyo, Japan

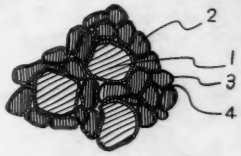
Filed Feb. 1, 1989, Ser. No. 305,371

Claims priority, application Japan, Sep. 13, 1988, 63-227457

Int. Cl.[5] B24D *3/02*

U.S. Cl. 51—309 **21 Claims**

1. A metal bonded diamond wheel which comprises a porous sintered body comprising a mixture of the bonding metal powder particles being coated with a layer of coating metal selected from the group consisting of iron, cobalt and nickel or



an alloy mainly composed thereof, "said bonding metal being a metal other than said coating metal".

4,977,711

THERMAL INSULATION MATERIAL AS INSULATING AND SEALING LAYER FOR ROOF AREAS

Herbert Prignitz, Papyrusweg 12, D-2000 Hamburg 74, Fed. Rep. of Germany

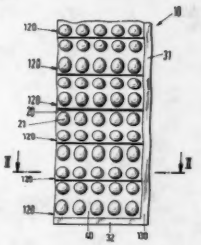
PCT No. PCT/EP88/00999, § 371 Date Jan. 9, 1989, § 102(e) Date Jan. 9, 1989, PCT Pub. No. WO89/04409, PCT Pub. Date May 18, 1989

PCT Filed Nov. 4, 1988, Ser. No. 299,834

Claims priority, application European Pat. Off., Nov. 5, 1987, 87116268.1

Int. Cl.[5] E04C *1/00*

U.S. Cl. 52—309.8 **23 Claims**



1. An article of insulation positionable between a surface to be covered and an external environment, said article comprising:

a layer of sealing material having a given area defined by a longitudinal and a transverse edge;

an insulation material having a first face facing toward said layer of sealing material and a second face facing oppositely thereof, said insulation material being sized and disposed on said layer of sealing material such that portions of its given area are exposed so as to define at least two overlap sections; and

means provided on said insulation material second face for forming diffusion channels on said insulation material second face for drawing off humidity from between said second face and said surface to be covered.

4,977,712

HAND SANDER

Charles P. Fisher, 161 Belknap Rd., Framingham Center, Mass. 01701, and George M. Pahud, 62 Robinwood Ave., Needham, Mass. 02192

Filed Jun. 16, 1989, Ser. No. 367,850

Int. Cl.[5] B24D *17/00*

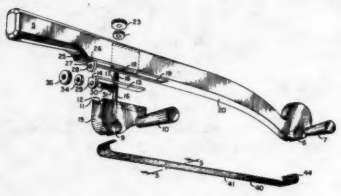
U.S. Cl. 51—380 **2 Claims**

1. A hand sander comprising,

an elongated C-shaped frame having opposed ends,

an elongated strip including a flexible sheet coated on one side with abrasive particles and a enforcing sheet laminated to the other side of said flexible sheet, and

means securing the ends of the strip one each to said C-shaped frame ends with the intermediate portion of said strip spaced from said C-shaped frame,



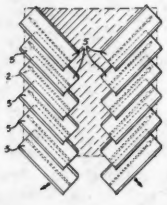
wherein said means for securing ends of said strip to said C-shaped frame ends comprises a pair of tapered pegs and means forming a pair of tapered holes, one in each of said ends to receive said pair of tapered pegs with one end of said elongated strip second between each of said pegs and each cf said tapered holes.

4,977,713

CONVERTIBLE AND REVERSIBLE SOLAR SHED OR CEILING

Salvador M. Zveibil, R. Tomé Portes, 1256, Sao Paulo, Brazil 04623

Filed Jul. 28, 1989, Ser. No. 386,573
Claims priority, application Brazil, Aug. 3, 1988, 8804046
Int. Cl.[5] E04B *1/346*
U.S. Cl. 52—65 **6 Claims**



1. A convertible and reversible solar shed or ceiling, comprising:

two ranks of parallel and aligned compound plates (1, 1');

vertical bearings about which said compound plates are pivotable and rotatable;

said plates being rectangularly shaped and arcuately profiled and arranged in two by two, face to face relationship at uniform spacings to at least partially cover a gap therebetween and an area thereunder;

a rack device for controlling and coordinating each rank of plates (1, 1'), said rank device causing simultaneous actuation of said plates (1, 1'), so that said plates turn at 0° and at 180° in each rank, said plate being adapted to rotate at 0° resulting in said plates following each other thereby fully covering said gap and said area, said plates being adapted to rotate at 90° resulting in parallel arrangement of said plate with respect to a longitudinal direction of said rank thereby providing semi-aperture coverage and partial opening of said area, and forming two vertical walls of plates,

said plates being adapted to rotate at 180° resulting in alignment of said plates opposite to each other to completely open said gap and said area to surrounding environmental conditions,

said plates adapted to be placed at any intermediate point between 0° and 180°;

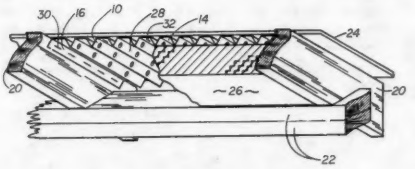
each rank of plates having a collective control and wherein all collective controls are connected to a single control to provide for instantaneous response by said plates.

4,977,714

ROOF VENTILATION BAFFLE

Stephen E. Gregory, Jr., 2951 Laurentide Dr., Ann Arbor, Mich. 48103

Filed Sep. 12, 1988, Ser. No. 243,411
Int. Cl.[5] E04B *1/74;* E04D *13/16*
U.S. Cl. 52—95 **11 Claims**



1. A pleated ventilation baffle comprising a plurality of longitudinal strips integrally joined longitudinally by flexible means to form a substantially pleated baffle extendable and contractable in the lateral direction,

a plurality of ventilation holes in the longitudinal strips, and integral longitudinal strips at the lateral extremities of the baffle to form means for attachment to studs, joists or rafters.

4,977,715

REINFORCED-CONCRETE BUILDING ELEMENT

Guido Krumbach, Wuppertal, Fed. Rep. of Germany, assignor to Hochtief Aktiengesellschaft Vorm. Gebr.Helfmann, Essen, Fed. Rep. of Germany

Filed Nov. 6, 1989, Ser. No. 433,040
Claims priority, application Fed. Rep. of Germany, Nov. 10, 1988, 3838069
Int. Cl.[5] E04C *3/10, 3/26, 5/12, 5/16*
U.S. Cl. 52—223 R **5 Claims**

1. In a concrete mass, a reinforcement comprising:

a group of generally parallel, longitudinally extending, and transversely spaced multifilament cables extending in the mass and each having a pair of longitudinally opposite ends;

a respective longitudinally extending resin sheath surrounding each cable between its ends;

a plurality of spacers spaced longitudinally along the cables and their sheaths and holding same transversely apart, each spacer being formed with a plurality of outwardly open seats each receiving a respective one of the sheaths, the concrete mass extending between the sheaths;

respective belts engaged circumferentially and around each

spacer and retaining the cables in the seats of the respective spacer;

an anticorrosion and antifriction agent inside each sheath surrounding each cable inside the respective sheath between the respective cable ends; and

a respective anchor bracing each cable end against the concrete mass.

4,977,716

GLAZING BARS AND GLAZING ASSEMBLIES

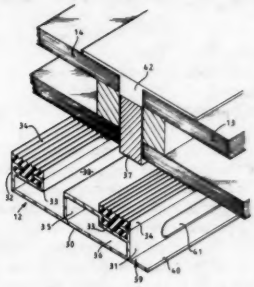
Glynn J. Hawkins, Kempsey, England, assignor to Hempsted Glazing Systems Ltd., Tewkesbury, England

Filed Aug. 10, 1989, Ser. No. 392,375

Claims priority, application United Kingdom, Aug. 13, 1988, 8819333

Int. Cl.[5] E04B *2/88*

U.S. Cl. 52—235 **11 Claims**



1. A glazing bar comprising sealing means for sealing against one side of each of two glazing units arranged in end by end relationship in a non-horizontal plane, an internal passage communicating with an end of the glazing bar, a condensation trap along one edge of the glazing bar for collecting condensation running down the one side of an, in use, upper of the two glazing units, and an opening communicating the condensation trap with the internal passage whereby, in use, condensation collected in the trap passes into the internal passage, from where it can drain away, the condensation trap comprising a gutter extending lengthwise along the one edge of the glazing bar, the gutter having an open side which is spaced from and which faces a plane containing that surface of the sealing means which, in use, seals against the glazing units.

4,977,717

APPARATUS FOR MOUNTING PANEL MEMBER

Sotoharu Niwata, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Dec. 27, 1989, Ser. No. 457,354

Claims priority, application Japan, Dec. 28, 1988, 63-329379

Int. Cl.[5] E04H *1/00*

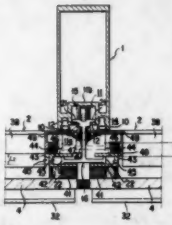
U.S. Cl. 52—235 **1 Claim**

1. An apparatus for mounting a panel member (4), comprising:

a panel column (1) fixedly mounted on a building body so as to extend vertically, in an exterior-side portion of which panel column (1) is formed a concave groove (11) provided with a narrow opening portion (11*a*) and a wide opening portion (14), said concave groove (11) extending a longitudinal direction of said panel column (1);

a frame member (40) fixedly mounted on an interior-side vertical edge portion of said panel member (4), said frame member (4) being provided with a groove portion (45) which opens sideward and is provided with a notch portion (46) opening into the interior of said building body;

a supporting member (16) provided with a base portion (20) one of opposite ends of which is formed into a mounting-flange portion (21) slidably inserted into said wide opening portion (14) of said concave groove (11) of said panel column (1), the other of said opposite ends being formed into an engaging-flange portion (22) which is slidably inserted into said groove portion (45) of said frame member (4) through said notch portion (46) of said groove portion (45), said mounting-flange portion (21) of said supporting member (16) being received in said concave groove (11) of said panel column (1) in such a manner as to be movable between an interior-side position and an exterior-side position and also to be movable in a vertical direction;



a positioning block (15) for positioning said supporting member (16) in a vertical direction along said concave groove (11) of said panel column (1), said positioning block (15) being fixedly mounted in said concave groove (11) of said panel column (1) at a position under said wide opening portion (14) of said concave groove (11) of said panel column (1); and

a screw (47) for fixedly mounting said supporting member (16) on said panel column (1) in a condition in which said engaging-flange portion (22) of said supporting member (16) engages with said groove portion (45) of said frame member (40).

4,977,718

BENT POSITION RETENTION FLEXIBLE CORNER BEAD STRIP

Dennis Hoffman, Sr., Palatine, Ill., assignor to Pro Patch Systems, Inc., Palatine, Ill.

Continuation-in-part of Ser. No. 197,522, May 23, 1988, Pat. No. 4,835,925, which is a continuation-in-part of Ser. No. 88,796, Aug. 24, 1987, abandoned. This application May 16, 1989, Ser. No. 352,756

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[5] E04F *19/02, 13/06*

U.S. Cl. 52—288 **16 Claims**

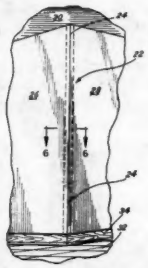
1. An improved flexible corner bead strip for reinforcing a dry wall corner, said corner bead strip comprising:

first and second plastic strips, each having a substantial longitudinal dimension corresponding with the length of the dry wall corner to be reinforced, and each having a transverse dimension defining a corner line formed from the respective central and abutting edges of each of said first and second plastic strips, said first and second plastic strips formed from a first polymeric material having substantial rigidity;

flexible joinder means disposed at said respective central and abutting edges forming said corner line for substantially flexibly securing said first and second plastic strips together and for permitting each of said first and second plastic strips to be bent at a selected angle corresponding to the angle of said dry wall corner for securement thereto to reinforce said dry wall corner, said flexible joinder means comprising a plastic hinge which is substantially V-shaped in transverse cross-section to enhance retention

of said first and said second plastic strips in the bent position; and

dry wall compound adhering surface means disposed upon at least one of said first and second plastic strips for adhe-



sion of the dry wall compound to the exposed surface in situ of said first and second plastic strips, whereby the dry wall corner may readily, stably and securely be reinforced substantially independently of and regardless of the angle of such corner.

4,977,719

FIRE RESISTANT EXPANSION JOINT

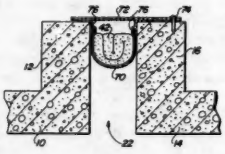
Allan R. LaRoche, 1458 Deerfield Cir., Roseville, Calif. 95678; Douglas S. Pearmain, 44 Fern St., Auburn, Me. 04210, and Denis M. Kelleher, 3981 S. Benton Way, Denver, Colo. 80235

Continuation-in-part of Ser. No. 7,208,696, Jun. 20, 1988, Pat. No. 4,866,898. This application Sep. 6, 1989, Ser. No. 403,531

The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.

Int. Cl.[5] E04B *1/74*

U.S. Cl. 52—396 **8 Claims**



1. In an expansion joint having spaced members subject to relative transverse movement, a fire barrier comprising:

an elongated flexible fire resistant sheet having side edge portions;

mounting flange means attached to the side edge portions of the flexible sheet;

each mounting flange means being connected to one of the spaced members to support the flexible sheet adjacent the spaced members;

resilient fire resistant insulation supported by the flexible sheet;

the flexible sheet being comprised of inorganic refractory fiber and the insulation being comprised of inorganic refractory fibers; and

the flexible sheet being curved across its width to accommodate movement of the spaced members away from each other.

4,977,720

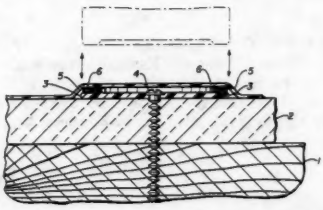
SURFACE WELDED THERMOPLASTIC ROOFING SYSTEM

Charles A. Kuipers, 1331 Crestview Dr., Denver, Pa. 17517

Filed Jun. 26, 1989, Ser. No. 371,312

Int. Cl.[5] E04B *5/00*

U.S. Cl. 52—408 **2 Claims**



1. A surface welded thermoplastic roofing system comprising in combination:

(a) A roof supporting deck having a layer of thermal insulation mounted on the top thereof;

(b) A plurality of thermoplastic fastener plates mounted on the top of the thermal insulation and affixed to the deck by means of a fastener that penetrates the thermal insulation;

(c) A thermoplastic top membrane overlying the fastener plates and covering the roof; and

(d) A fused thermoplastic welding material on a preselected number of fastener plates and fused to the top surface of the fastener plate and to the bottom surface of that portion of the top membrane overlying the fastener plate, said thermoplastic welding material comprising a thermoplastic material containing ferromagnetic material susceptible to induction heating.

4,977,721

RIGID COVERING FOR ROOFS AND SUPPORTS THEREFOR

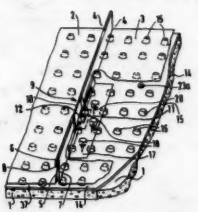
Patrick Blosseville, and Claude Dubrac, both of Fourges, France, assignors to Vieille Montagne France S.A., Bagnolet, France

Filed Dec. 26, 1989, Ser. No. 457,104

Claims priority, application France, Jul. 26, 1989, 89 10071

Int. Cl.[5] E04D *1/34*

U.S. Cl. 52—410 **6 Claims**



1. A roof system for application to an unventilated roofing support forming a planar receiving surface, comprising in combination:

a continuous, intermediate plate formed of a plastic material capable of absorbing expansion and of isolating the roofing support from the environment, said plastic having high strength, being durable and not causing chemical electrical corrosion with the metal covering;

a uniform pattern of hollow, frusto-conical plastic studs having a substantially planar head integral with and pro-

jecting from one side of said plate forming spacing elements;

means for attaching the plate directly to the support by fastening elements sealingly received through the plate;

support members disposed on the intermediate plate and fastening means sealingly received through the intermediate plate into the roofing support for fastening the support members to the roofing support; and

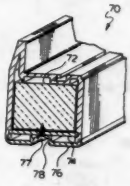
a metal covering formed of a plurality of corrosion-resistant metal plates having upstanding interfitting edges forming troughs therebetween running in the direction of the slope of the roof, said covering being laid on the planar heads of said studs and supported by said support members forming a ventilation space between the metal covering and the intermediate plate for capturing leaks and condensation from the metal roof covering.

4,977,722

FRAME SYSTEM

Donald M. Taylor, Orangeville, Canada, assignor to Repla Limited, Ontario, Canada

Filed Jun. 14, 1989, Ser. No. 366,077
Int. Cl.[5] E04B *9/17*
U.S. Cl. 52—731 **37 Claims**



1. A frame for a substantially planar closure, said frame comprising a plurality of side members, each said member being of generally U-shaped channel section having a pair of opposed leg portions with an interconnecting end portion therebetween, and forming an open sided substantially rectangular cavity to receive a substantially rectangular support member in inserted relation therein, the inner surface of said end portion having at least one protrusion extending inwardly therefrom within said cavity, to space said support member in load transfer substantially thermal isolating relation from said section end portion; the outer surface of said end portion providing an inner peripheral surface to the frame member having a glazing stop abutment extending there along in spaced relation from said frame member, and a glazing stop recess extending parallel therewith in spaced relation from said abutment, having said opposed leg portions extending outwardly of the frame as peripheral face portions thereof, said channel section providing access to the frame interior for interior frame portions located therein.

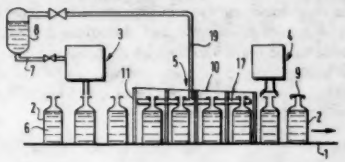
4,977,723

PLANT FOR PACKING PRODUCTS IN CONTAINERS

Gérard Dubrulle, Elancourt, and Alain Roullet, Villejuif, both of France, assignors to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris, France

Continuation of Ser. No. 233,411, Aug. 17, 1988, abandoned.
This application Dec. 14, 1989, Ser. No. 488,364
Claims priority, application France, Aug. 17, 1987, 87 11636
Int. Cl.[5] B65B *31/02*
U.S. Cl. 53—110 **7 Claims**

1. A plant for packing products in containers each having a top opening, said plant comprising a conveyor, a device for injecting liquefied gas into the containers and placed above the conveyor such that upon vaporization of said liquefied gas, air is removed from the containers by a flow of vaporized gas, a device for closing the containers and placed above the conveyor and on the downstream side of the injecting device relative to a direction of travel of the conveyor, and a tunnel for protecting the containers against surrounding air, said tunnel covering the conveyor and extending between the injecting device and the closing device, said tunnel comprising, in at least a pat of the length thereof, an upper wall located at a distance from the openings of the containers which is short



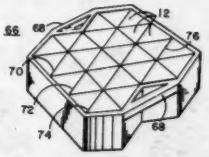
enough to limit the section of the passage of gas out of the containers and to increase the exit velocity of said gas from said containers, said tunnel further comprising means for injecting said gas in a gaseous state into the tunnel while said containers are open, and means positioning said gas injecting means so that said gas is directed solely toward the sides of said containers below said top openings along at lest said part of the tunnel to prevent the backward diffusion of air into the containers.

4,977,724

HEAT SEALED DISPOSABLE PAINT BAG AND METHOD

Dae S. Kim, 1178 Walnut St., Newton, Mass. 02161

Filed Aug. 1, 1989, Ser. No. 388,575
Int. Cl.[5] B65B *43/08*
U.S. Cl. 53—456 **4 Claims**



1. A method of making disposable compressible plastic paint bags, wherein the method comprises:

laying out a long flat sheet of compressible plastic material folded over to form a double sheet;

applying hot thin linear elements to the long flat sheet in alternating angles transversely across the long flat sheet along its length to form separate double trapezoidal double thick pieces heat sealed together at each end;

holding each trapezoidal piece vertically with the long parallel edge at the bottom, cutting one bottom corner, injecting air into the trapezoidal piece, crimping each of the two ends of the trapezoidal piece at the bottom to flatten out a triangular section at each end horizontally, thereby causing the trapezoidal piece to flare outwardly separating the two sheets at the bottom and creating a tent-shaped structure;

applying a hot thin heat linear element at the intersection of a crimped triangular section and the tent-shaped structure opposite the cut corner to seal an end of the tent-shaped structure;

filling the tent-shaped structure through the cut corner, crimping the cut end of the trapezoidal piece at the bottom to flatten out a triangular section at the cut end horizon-

tally, and heat sealing the cut corner end of the tent-shaped structure with a hot thin linear element at the intersection of the crimped triangular section and the tent-shaped structure to seal the end of the tent-shaped structure, thereby creating an elongated strip of compressible plastic forming a rectangular bottom and folding upwardly at an acute angle on two long edges of the bottom to form two rectangular sides meeting at a ridge along the top, and triangular segments folded over each end from each side to meet in vertical heat sealed seems forming triangular ends and the triangular ends heat sealed to the bottom to form an enclosed tent-shaped bag for holding paint to be used in a paint applicator wherein the bag is punctured and compressed to squeeze paint into a paint applying surface.

4,977,725

PHOTOGRAPH SLIDE SLEEVING SYSTEM

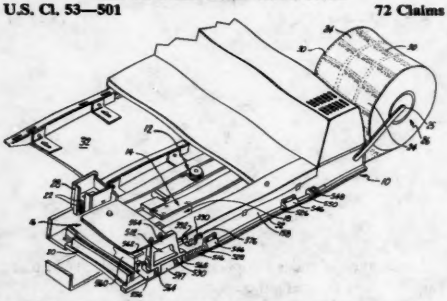
Wilbur Gerrans, Snobomish, Wash., and James A. Truc, Wayzata, Minn., assignors to Pakon, Inc., Minnetonka, Minn.

Filed Jan. 12, 1989, Ser. No. 296,478

Claims priority, application European Pat. Off., Jul. 14, 1988, 8811352

Int. Cl.[5] B65B *43/12, 43/26, 57/20*

U.S. Cl. 53—501 72 Claims



1. A sleeving system for inserting photograph slides into pockets of slide sleeving material having a plurality of rows of pockets, including:

slide positioning means for positioning photograph slides adjacent pocket opening slots of a row of pockets into which the photograph slides are to be inserted;

first pocket opening means for arcing the slide sleeving material adjacent the pockets so as to open the pocket opening slots, the first pocket opening means including:

first and second support means for supporting the slide sleeving material on opposite ends of the row of pockets into which the photograph slides are to be inserted; and

extending member means extending into engagement with the sleeving material between the first and second support means and on a side of the sleeving material opposite the pocket opening slots, to arc the sleeving material adjacent the row of pockets into which slides are to be inserted; and

slide pusher means for pushing the photograph slides into the pockets of the slide sleeving material through the pocket opening slots.

4,977,726

CONTINUOUS SIGNATURE STACKER MACHINE PROVIDED WITH SPECIAL DEVICE FOR TRANSVERSELY EJECTING THE ASSEMBLED PACKAGE

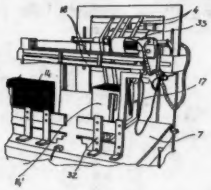
Aldo Perobelli, and Giorgio Pessina, both of Cusano Milanino, Italy, assignors to O.M.G. di Diorgio Pessina e Aldo Perobelli S.n.c., Milan, Italy

Filed Apr. 5, 1989, Ser. No. 334,091

Claims priority, application Italy, Apr. 18, 1988, 20239 A/88

Int. Cl.[5] B65B *35/50, 63/02*

U.S. Cl. 53—542 8 Claims



1. Signature stacker machine comprising a platform (7) wherein the signatures (3) are transferred forming progressively vertical signature packages (14,14') fed along said platform (7); a slide member (9) moved by two parallel chains (8) along said platform (7) pushed by the forming signature package (14); an ejecting device (17) adapted for transferring along a path transversely to said platform (7) a signature package (14) to a predetermined position (54) where a processing machine (56) is located, characterized in that said chains (8) project slightly above said platform (7) moving the signatures along the platform (7) and in that said slide member (9) pressed by the signatures is pivoted to two arms (10), each engaging one of said chains (8), when the signatures press against said slide member (9) and both arms (10) being free from said chains (8) when there is not pressure of the signatures against such slide member (9) during the transfer of the package (14) actuated by said ejecting device (17).

4,977,727

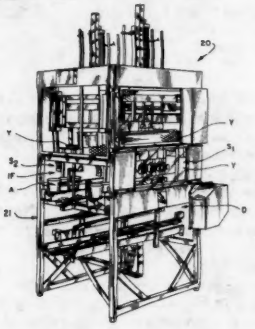
APPARATUS FOR FILLING CASES WITH A PLURALITY OF ARTICLES ARRANGED IN A PREDETERMINED PATTERN

Joseph P. Milleson, Ft. Atkinson, Wis., assignor to APV Crepaco, Inc., Lake Mills, Wis.

Filed May 16, 1989, Ser. No. 352,745

Int. Cl.[5] B65B *5/08, 35/36*

U.S. Cl. 53—543 15 Claims



1. An apparatus for loading a plurality of articles arranged in

a predetermined pattern into at least one open top receptacle, said apparatus comprising a frame having a first station wherein the plurality of articles are assembled in the predetermined pattern, and a second station spaced from said first station wherein at least one receptacle is positioned; first conveyor means for moving the articles to a pair of staging areas disposed on opposite sides of said first station, the articles being arranged in a row when disposed at each staging area; a second conveyor means for successively moving open top receptacles to said second station and then subsequently moving same when loaded away from the second station; a set of article-engaging means mounted proximate each staging area, each set being sequentially adjustable to effect engagement of the row of articles in the proximate staging area, raising the engaged articles to a preliminary station, laterally offsetting and segregating at least one engaged article from the row and relatively repositioning the remaining engaged articles in the row while the engaged articles are disposed at the preliminary station, and moving the segregated and repositioned articles to the first station whereby the articles engaged by both sets of article-engaging means coact to form the predetermined pattern; means for moving the articles in the predetermined pattern from the first station and depositing same into the open top receptacle at the second station; and means for returning each set of article-engaging means to proximate the respective staging area.

4,977,728

MACHINE FOR MAKING TEA-FILLED DOUBLE-CHAMBER BAGS

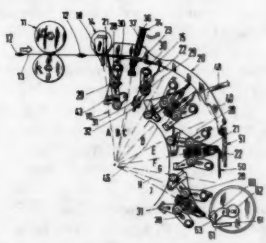
Adolf Rambold, Meerbusch, Fed. Rep. of Germany, assignor to Teepack Spezialmaschinen GmbH & Co. KG, Meerbusch, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 317,186

Claims priority, application Fed. Rep. of Germany, Feb. 29, 1988, 3806386

Int. Cl.[5] B65B *9/10*

U.S. Cl. 53—567 **10 Claims**



1. A machine for manufacturing tea-filled double-chamber bags from a continuous tubular web of material in which portions of tea have been deposited at equally spaced distances in the tubular web of material, said machine comprising cutting means for cutting off a tube piece from the tubular web of material containing two portions of tea; a transporting wheel continuously rotatable about an axis for receiving the cut-off tube piece, said transporting wheel having a peripheral surface and an upper apex; a plurality of arms pivotably mounted on said transporting wheel and arranged in pairs at equal angular distances for holding the tube piece; a device for forming a bottom fold in the tube piece, said device comprising a W-shaped profile associated with each pair of arms and located at the level of the peripheral surface of said transporting wheel, and holding-down means cooperating with said W-shaped profile to form the bottom fold; and a stationary cover located in an area of the upper apex of said transporting wheel and extending in a rotational direction of said transporting wheel essentially at the peripheral surface of said transporting wheel, said cover having an underside surface means; said arms having free ends and bearing surfaces located at end faces of said free ends, respectively for receiving the tube piece and for pressing it against said underside surface means of said cover, said W-shaped profile being an independent profiled part having outer legs, said outer legs comprising flexible side parts, respectively, for holding the bottom fold in place after it is released by said holding-down means, said outer legs being lowered in synchronism with a closing movement of said arms.

4,977,729

APPARATUS FOR THE AUTOMATIC PACKAGING OF A FRAGILE PRODUCT IN A FOLDING CARTON

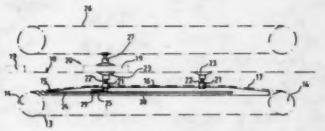
Wilhelm Fischer, Weidacher Str. 1-3, D-8968, Durach, Fed. Rep. of Germany

Continuation of Ser. No. 177,522, Feb. 9, 1988, abandoned. This application Jun. 21, 1989, Ser. No. 370,134

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3637112

Int. Cl.[5] B65B *43/10*

U.S. Cl. 53—574 **3 Claims**



1. Apparatus for packaging a fragile product in a folding carton having:

a rectangular base with two pairs of sides, the first pair being perpendicular to the second pair;

a first pair of side panels, one of which extends from each of the sides of the first pair of sides, a folding axis being formed between each of said first pair of side panels and the side of the base from which said side panel extends;

a second pair of side panels, one of which extends from each of the sides of the second pair of sides, a folding axis being formed between each of said second pair of side panels and the side of the base from which said side panel extends;

two lid flaps, one of which extends from each of the first pair of side panels; and

two closure flaps, one of which extends from each of the second pair of side panels; the packaging apparatus comprising:

conveyor means for transporting the carton on a path in a transport direction parallel to the folding axes of the first pair of side panels to allow folding about said folding axes along said path;

carton rotating means, comprising:

pivotable retaining means connected to said conveyor means for carrying the carton; and

rail means disposed below a portion of the conveyor means and extending along said portion at an angle to said transport direction so that, when said retaining means engages said rail means, said retaining means will be pivoted about a vertical axis through an angle of 90° as said retaining means traverses said portion so that said folding axes of said second pair of side panels extend parallel to the transport direction;

a first folding station for folding said carton about the axes of the first pair of side panels and a product placement station upstream of said rotating means;

a second folding station for folding said carton about the axes of the second pair of side panels downstream of said rotating means; and; said retaining means comprising a pair of disc members engaging the carton and mounting means for each disc member with one of said mounting means cooperating with said rail

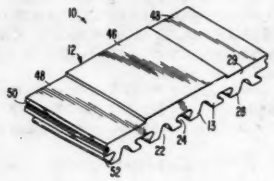
means for allowing rotation of each disc member about a vertical axis.

4,977,730

ROOF PAVER ELEMENT AND SYSTEM

Jorge Pardo, Reston, Va., assignor to National Concrete Masonry Association, Herndon, Va.

Filed Sep. 6, 1989, Ser. No. 403,357
Int. Cl.[5] E04B *5/04*
U.S. Cl. 52—602 **12 Claims**



1. A system of roof paver elements for providing ballast for a roof comprising:

a plurality of roof paver elements each comprising a body portion having a top, a bottom, and sides extending between the top and the bottom, wherein the roof paver elements are positioned in close proximity to one another to define a substantially continuous surface having narrow gaps between adjacent body portions;

means for defining drainage spaces below said body portions and between adjacent roof paver elements, wherein the area of the drainage space between two adjacent roof paver elements is larger than the area of the gap between the body portions of said two roof paver elements; and

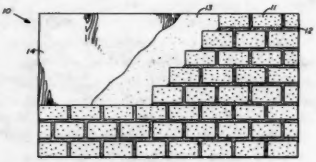
means for hindering the development of air pressure differentials between said drainage spaces and a region above said roof paver elements, said hindering means comprising a depression defined in a side of at least one of the body portions defining the gaps, whereby a pressure equalization chamber is formed between said adjacent body portions.

4,977,731

METHOD OF CONSTRUCTING MASONRY PANELS

Oswald J. Grainger, deceased, late of Houston, Tex., by Arlene E. Grainger, legal representative, assignor to Bruce Grainger, Houston, Tex.

Filed Sep. 28, 1989, Ser. No. 413,715
Int. Cl.[5] E04B *1/40, 1/00*
U.S. Cl. 52—747 **4 Claims**



1. A method of constructing a masonry faced tilt-up or pre-cast concrete wall panel comprising:

placing a positioning board on a level surface;

applying an adhesive coating to the top surface of said positioning board;

placing masonry units face-down on said adhesive coating;

applying joint-control means to the space between said masonry units;

placing a pouring form around the perimeter of said positioning board;

placing reinforcing rods in position within said pouring form, above said masonry units;

pouring concrete into said pouring form;

causing said concrete to dry;

removing said pouring form;

tilting-up the resultant concrete wall panel;

removing said positioning board from said resultant concrete wall panel;

removing said adhesive from the face of said masonry units; then

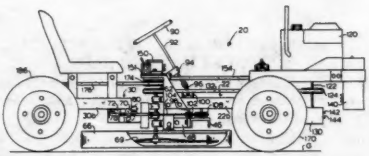
removing said joint-control means from between said masonry units to complete the construction of a masonry faced tilt-up or pre-cast concrete wall panel.

4,977,732

UNEVEN TERRAIN RIDING TRACTOR MOWER

William D. Minter, 1906 Jimmie Kerr Rd., Haw River, N.C. 27258

Filed Mar. 26, 1990, Ser. No. 498,951
Int. Cl.[5] A01D *34/64, 34/76, 69/03*
U.S. Cl. 56—11.4 **12 Claims**



1. A riding tractor lawn mower particularly adapted for mowing on uneven terrain, comprising:

(a) a frame structure having elongated front and rear frame sections, each frame section having a front end and a rear end;

(b) pivotal connecting means joining the rear end of said front frame section to the front end of said rear frame section for pivoting about a first axis located between said sections and oriented substantially perpendicular to the ground plane over which the tractor travels;

(c) a power source mounted on said frame structure and including a powered shaft;

(d) a front wheel assembly mounted on and below the front end of said front frame section and including a pair of front wheels each of which is mounted on an axle;

(e) a rear wheel assembly mounted on and below a rear end of said rear frame section and including a pair of rear wheels each of which is mounted on an axle;

(f) first drive means powered by said powered shaft and operative for simultaneously and continuously driving said front and rear wheels;

(g) a steering assembly including a steering wheel, a steering drive shaft mounted on said front frame section and operated by rotating said steering drive shaft and a steering linkage operated by said drive shaft and connected to said frame sections in a manner enabling the angular relation of said rear and front frame sections to be changed by rotation of said steering wheel to effect pivoting of said frame sections about said first axis to effect steering of the tractor;

(h) a mower assembly including a housing supported by and mounted below said frame structure and at least one mower blade rotatably mounted within said housing; and

(i) second drive means powered by said powered shaft and connected for driving said blade.

4,977,733

FOUR WHEEL STEERING TRACTOR HAVING A MID-MOUNT MOWER

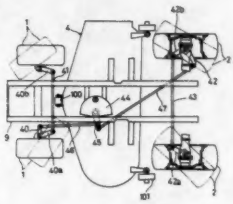
Kazuo Samejima; Tetsuaki Hayashi; Niro Bando; Kenji Matsuda; Tsuyoshi Sato; Teruo Shimamura; Toshihiko Hamada; Hironori Tsuchihashi; Yoshikazu Togoshi, and Masatami Fukuda, all of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Feb. 10, 1989, Ser. No. 309,519

Claims priority, application Japan, Feb. 17, 1988, 63-35596; Jul. 15, 1988, 63-94187[U]; Oct. 22, 1988, 63-266835; Nov. 28, 1988, 63-154631[U]

Int. Cl.[5] A01D *34/66*; B62D *7/00*

U.S. Cl. 56—14.7 **15 Claims**



1. A four wheel steering tractor comprising;

a steering wheel,

front wheels steerable by said steering wheel,

rear wheels steerable by said steering wheel,

a grass cutting system mounted in a lower space of the tractor between said front wheels and said rear wheels,

a gauge wheel depending from said grass cutting system, and

connecting means for operatively connecting said steering wheel to said front wheels and said rear wheels to transmit movement of said steering wheel to said front wheels and said rear wheels for realizing a four wheel steering mode to effect four wheel steering in which a center of tractor turning is located approximately on a projection of the axis of rotation of said gauge wheel.

4,977,734

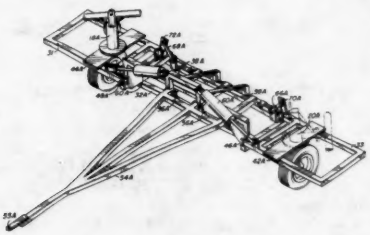
FOLDABLE HAY RAKE

Carroll G. Rowe, Rte. 3, P.O. Box 122 A1, Hope, Ark. 71801, and John D. Little, Rte. 1, P.O. Box 165, Fulton, Ark. 71838

Continuation-in-part of Ser. No. 388,434, Aug. 2, 1989, abandoned. This application Nov. 9, 1989, Ser. No. 433,807

Int. Cl.[5] A01D *78/14*

U.S. Cl. 56—15.9 **12 Claims**



3. A hay rake movable between a rake position and a transport position comprising,

a frame assembly supported by an axle and wheels for being moved by a vehicle,

left and right rake carrier brackets carried by the frame, each said bracket including a rotatable pivot forming an axis, and said brackets and axis positioned transversely to the axle,

a wheel rake pedestal rotatably connected to each bracket about said axis,

a fingerwheel rake assembly supported from each pedestal,

a vehicle hitch assembly pivotally connected to the frame and including means for connection to a vehicle,

power means connected between the frame and said brackets for rotating the wheel rake pedestals about their axis, and

a connecting linkage connected between the hitch assembly and the frame whereby actuation of the power means causes rotation of the frame relative to the hitch assembly for rotating the pedestals relative to the hitch assembly.

4,977,735

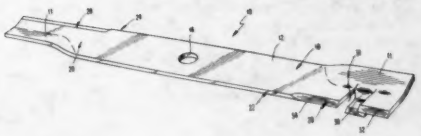
LAWN SCULPTURING METHOD AND APPARATUS

John W. Davis, 13223 Brackley Rd., Silver Spring, Md. 20904

Filed Dec. 6, 1989, Ser. No. 446,782

Int. Cl.[5] A01D *34/73*

U.S. Cl. 56—295 **19 Claims**



1. A sculpturing attachment for use with a rotary lawnmower for imparting a sculptured effect to a row of grass, comprising:

a rigid elongated lawnmower blade having a top surface, a bottom surface, an aperture formed vertically through said blade at a central longitudinal location of said blade, a first half located to a first longitudinal side of said aperture, a second half located to a second longitudinal side of said aperture, first and second leading edges, said first and second leading edges being those diametrically opposite edges of said blade that lead said first and second halves of said blade, respectively, as said blade rotates clockwise about a vertical axis defined centrally of said aperture; and

means, defined on at least one of said first and second leading edges, for cutting a row of grass such that a vertical transverse cross-section of said row is provided with first high portions of grass which are higher than second low portions of grass upon traversing of said blade longitudinally along said row as said blade is rotated, said high portions of grass being bounded at each transverse side of the row by said low portions of grass.

4,977,736

METHOD AND APPARATUS FOR HARVESTING FRUIT CROPS FROM BUSHES OR THE LIKE

Stanley J. Price, Jr., 4344 Brownsville Rd., Pittsburgh, Pa. 15236

Filed Jul. 10, 1989, Ser. No. 377,525

Int. Cl.[5] A01G *19/00*

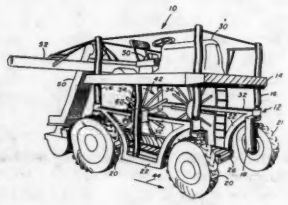
U.S. Cl. 56—330 **12 Claims**

1. A method for harvesting fruit from a bushy plant having a plurality of branches extending outwardly from a trunk comprising,

positioning a dislodging member above a bushy plant,

inserting at least a portion of a dislodging member downwardly from above between the ends of said branches and said trunk into said bushy plant, and

after at least a portion of said dislodging member is inserted from above said bushy plant moving said dislodging mem-



ber generally horizontally toward and away from said trunk to dislodge said fruit from said branches.

4,977,737

METHOD OF CONTROLLING THE DRIVING OF A RING SPINNING FRAME

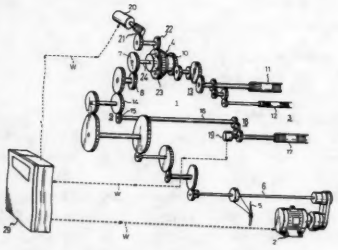
Koichi Yamada; Hiroshi Enomoto, both of Aichi, and Osamu Yoshida, Gifu, all of Japan, assignors to Howa Machinery, Ltd., Aichi, Japan

Filed Apr. 2, 1990, Ser. No. 502,758

Claims priority, application Japan, Apr. 7, 1989, 1-89078

Int. Cl.[5] D01H 1/22, 1/26, 5/32, 5/38

U.S. Cl. 57—97 3 Claims



1. In a method of driving a ring spinning frame provided with a plurality of spindles driven to produce full packaged cops thereby, while controlling a rotation speed thereof with a predetermined program wherein said rotation speed of said spindles is stepwisely increased from zero to a predetermined maximum value of said rotation speed via at least a predetermined intermediate value of said rotation speed, said spindles are then driven at said maximum rotation speed to create a main portion of said full packaged cop, and finally, said rotation speed is stepwisely reduced to zero via at least said intermediate rotation speed, for producing a particular yarn in a form of a full packaged cop, with a predetermined total draft, an improvement comprising,

previously measuring a relationship between loss of thickness of said particular yarn and said rotation speed of spindles, when said rotation speed of said spindles is higher than a predetermined rotation speed,

automatically regulating said total draft in a reverse condition to compensate said possible loss of thickness of said particular yarn each time said rotation speed of said spindles is changed in such a condition that said rotation speed of said spindles is higher than said predetermined rotation speed in accordance with said relationship between a loss of thickness of said particular yarn and said rotation speed of said spindles.

4,977,738

PROCESS AND A MACHINE ARRANGEMENT FOR SLIVER PROCESSING

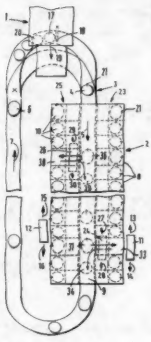
Fritz Stahlecker, Bad Ueberkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest

Filed Feb. 10, 1989, Ser. No. 308,627

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805203

Int. Cl.[5] D01H 9/00, 15/00

U.S. Cl. 57—281 10 Claims



1. A process for processing textile fibers, comprising:

producing sliver in a first machine and depositing said sliver in containers, and

conveying said containers with sliver to a second machine for further processing of the slivers,

wherein said depositing of said sliver in respective containers at said first machine includes automatically gripping an end portion of said sliver with gripping means and fixing said end portion to a specified position at the respective containers by sliver end fixing means, wherein said end portion is severed from the supply of sliver from the first machine by severing means and already fixed at a specified position of the respective containers before the containers are conveyed to the second machine, thereby assuring proper orientation of the end portions at the containers during the subsequent conveying and processing at the second machine, and wherein the sliver end fixing means include gripping means for gripping respective end portions of the sliver, said gripping means including at least one arm provided with a receiving device for the sliver, this arm being applicable to the sliver and to the pertaining container.

4,977,739

METHOD AND APPARATUS FOR MAKING COMPOSITE YARN

Douglas R. Buchanan, Odessa, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed Jun. 26, 1989, Ser. No. 371,184

Int. Cl.[5] D02G 3/26, 3/28; D01H 7/92

U.S. Cl. 57—293 5 Claims

1. A method of plying yarns to obtain a composite yarn comprising the steps:

of separating at least three spaced, parallel strands of yarn into at least two bundles, at least one of which is a multi-strand bundle having at least two strands;

applying a substantially equal amount of tension to the strands and converging the strands of the multi-strand bundle while keeping the bundles separate from one another;

simultaneously applying alternating twisting means to twist

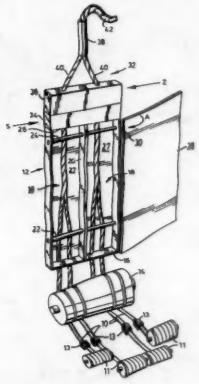
the strands and ply together the strands of each multi-strand yarn in alternating S and Z bundle directions of twist separated by nodes;

converging the bundles in a restricted area to cause said bundles to partially untwist and thereby ply together in a composite direction of twist opposite to said bundle direction of twist to produce said composite yarn.

2. An apparatus for making a composite yarn comprising:

guide means for guiding at least three spaced parallel strands;

tensioning means for applying substantially equal tension to said strands;



separation means for separating said strands into at least two bundles, at least one of which is a multi-strand bundle having at least two strands,

twisting means for twisting each of the bundles in an alternating S and Z bundle direction of twist between filament nodes of zero twist;

first converging means for converging the strands of each multi-strand bundle located between said guide means and said twisting means;

second converging means located after said twisting means for converging said bundles in a restricted area and allowing said bundles to partially untwist and ply together in a composite direction of twist, which is opposite to the bundle direction of twist.

4,977,740

DUAL FUEL INJECTOR

Thomas J. Madden, Vernon; Barry C. Schlein, Wethersfield, and W. Barry Wagner, Bolton, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 7, 1989, Ser. No. 362,534

Int. Cl.[5] F02C *3/22, 3/30, 7/22*

U.S. Cl. 60—39.463 **4 Claims**

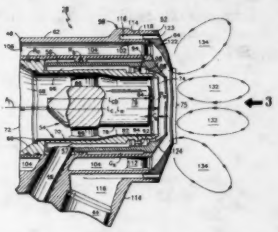
1. A fuel injector for a gas turbine engine having passages for liquid fuel and for gaseous fuel extending circumferentially about an axis, the injector having a discharge region downstream of the injector, which comprises:

means for forming two, annular, co-rotating streams of air and for discharging the streams into a discharge region and directing the streams of air toward each other;

means for flowing liquid fuel and water through the injector between the two co-rotating streams prior to discharge from the injector into the discharge region and for discharging the liquid fuel and water into the discharge region between the two co-rotating streams in the discharge region;

means for flowing gaseous fuel and steam through the injector circumferentially about the outermost stream of air and injecting the gaseous fuel and steam into the discharge region;

wherein the disposition of the air passages relative to the gaseous fuel and steam passages avoids having a supply



conduit for the gaseous fuel and steam interrupt the outermost air passage and wherein each of the means for flowing fuel is adapted to carry water in the same state as the fuel to efficiently mix water and fuel with rotating air streams.

4,977,741

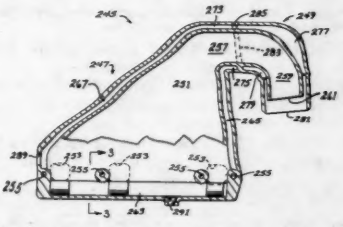
COMBINATION EXHAUST MANIFOLD AND EXHAUST ELBOW FOR MARINE PROPULSION SYSTEM

Ricky H. Lulloff, Neenah; Jeffrey P. Ruhnke, Fond du Lac, and Robert C. Lloyd, Oshkosh, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 177,677, Apr. 5, 1988, abandoned. This application Apr. 25, 1989, Ser. No. 343,019

Int. Cl.[5] F01N *3/02, 7/10*

U.S. Cl. 60—310 **22 Claims**



1. An assembly for cooling exhaust from an internal combustion engine, comprising:

a manifold including an exhaust cavity for receiving exhaust from said engine;

a discharge exhaust passage leading from said exhaust cavity for discharging exhaust therefrom;

first water jacket means around said exhaust cavity;

second water jacket means around said discharge exhaust passage;

means separating said first and second water jacket means, and including passage means providing communication therebetween;

a first inlet for introducing water into said first water jacket means, said first inlet receiving engine cooling water after warm-up of said engine cooling water to a predetermined temperature;

a second inlet for receiving overflow cooling water or engine cooling water prior to warm-up of said engine cooling water to said predetermined temperature; and

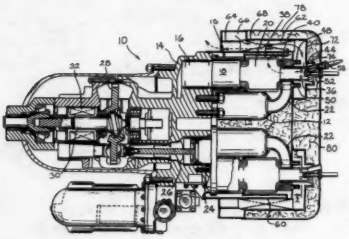
means for preventing turbulence of water disposed within said first water jacket means during supply of water to said second inlet.

4,977,742

STIRLING ENGINE WITH INTEGRATED GAS COMBUSTOR

Roelf J. Meijer, Ann Arbor, Mich., assignor to Stirling Thermal Motors, Inc., Ann Arbor, Mich.

Filed Apr. 21, 1989, Ser. No. 341,424
Int. Cl.[5] F02G 1/04
U.S. Cl. 60—525 7 Claims



1. A Stirling engine comprising:

a plurality of heat transfer stacks having a cooler, regenerator and heat exchanger stacked end-to-end with a working cylinder adjacent each of said stacks and connected therewith by a hot connecting duct,

said heat exchangers including an annular cluster of circumferentially spaced tubes extending from said regenerator in a substantially axial direction to an annular manifold axially spaced from said regenerator such that at any given time during operation of said Stirling engine working fluid in said tubes is flowing in a single axial direction through said heat exchanger,

a combustion chamber on an end of each of said stacks having a gas flow outlet communicating with the interior of said heat exchanger tube cluster,

air inlets for each of said combustion chambers for allowing air to enter the interior of said chambers, and

a nozzle within said combustion chambers for introducing a combustible fuel within said combustion chambers, whereby said combustible fuel and air combust in said combustion chambers and generate hot gases which pass between said tubes applying heat to said heat exhanger.

4,977,743

COOLING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES EQUIPPED WITH SUPERCHARGERS

Yasuyuki Aihara; Shigeki Baba; Chiharu Shimizu, and Eitetsu Akiyama, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 290,174
Claims priority, application Japan, Dec. 28, 1987, 62-199413[U]; Dec. 28, 1987, 62-332920; Dec. 28, 1987, 62-332919; Dec. 28, 1987, 62-332918; Dec. 28, 1987, 62-199412[U]; Dec. 28, 1987, 62-332922; Dec. 28, 1987, 62-332921; Dec. 28, 1987, 62-199410[U]; Dec. 28, 1987, 62-199411[U]; Jun. 3, 1988, 63-138075
Int. Cl.[5] F01P 3/20, 7/08
U.S. Cl. 60—605.3 28 Claims

1. A cooling control system for an internal combustion engine having a supercharger, an engine room accommodating said supercharger, a first cooling system for cooling said engine, and a second cooling system for cooling said supercharger, comprising:

first sensor means for detecting stoppage of said engine;

second sensor means comprising first temperature detecting means for detecting the temperature of coolant at a location downstream of said supercharger in said second cooling system, and second temperature detecting means for detecting a temperature representative of said engine in said first cooling system;

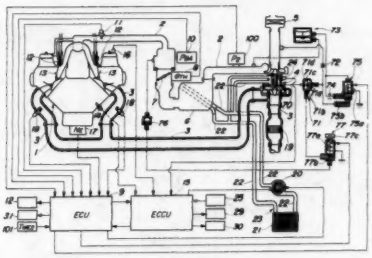
pump means for supplying coolant for cooling said supercharger to said second cooling system;

pump driving means for electrically driving said pump means;

cooling fan means arranged in said engine room;

fan driving means for electrically driving said cooling fan means;

timer means for determining whether or not at least one predetermined time period has elapsed; and



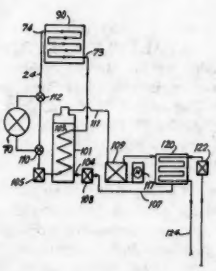
control means for controlling at least one of said pump driving means and said fan driving means in a manner such that operation of said pump means and operation of said cooling fan means are controlled based on a result of detection by said first and second sensor means and a result of determination by said timer means, said control means operating said pump driving means when the temperature detected by one of said first and second temperature detecting means of said second sensor means is above a predetermined value.

4,977,744

APPARATUS AND METHOD FOR EXTRACTING FOCUSED SOLAR RADIANT ENERGY

Erwin Lenz, 180 Cabrini Blvd., New York, N.Y. 10033

Division of Ser. No. 294,418, Jan. 9, 1989, Pat. No. 4,934,324, which is a division of Ser. No. 104,465, Oct. 5, 1987, Pat. No. 4,823,772. This application Mar. 30, 1990, Ser. No. 501,548
Int. Cl.[5] F03G 6/06
U.S. Cl. 60—641.15 4 Claims



1. An electricity generating system comprising two closed fluid circuits; a first fluid circuit containing a first fluid and comprising solar heat collecting apparatus which comprises a solar collector panel having an operating surface; rotatable support means for rotatably supporting the solar collector panel about a horizontal axis and a vertical axis; drive means for rotating the panel about the two axes; movement limiting control means comprising first limiting means for limiting movement of the panel about the horizontal axis to less than

180°, such that the operating surface continuously faces skyward; second limiting means for limiting movement of the panel about the vertical axis to less than 270°; constant speed motor means for continuously rotatably moving the panel about the two axes when the motor is activated; and programmable control means to set the initial angular position of the panel about the axes each day, and to activate the motor means at a predetermined time of day, such that the resultant movement of the panel about the two axes maintains the operating surface in positions substantially perpendicular to solar radiation during the entire daylight period; heat exchange means comprising two fluid flow means, one fluid flow means being in recirculating fluid flow relationship to the solar heat collecting apparatus; and a second fluid circuit containing a second fluid and comprising the second fluid flow means in the heat exchange means, whereby fluid in the first circuit is in indirect heat exchange contact with any fluid in the second circuit to heat the second fluid to its boiling point, and electric generating means, comprising means to convert heat energy in the fluid in the second circuit to generate electricity.

4,977,745

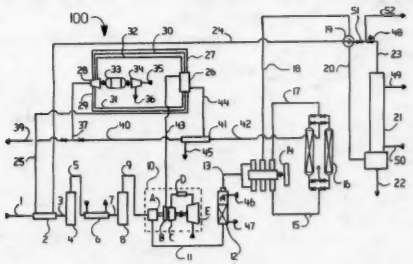
METHOD FOR THE RECOVERY OF LOW PURITY CARBON DIOXIDE

Albert N. Heichberger, 1778 Monument Oaks Dr., Jacksonville, Fla. 32211

Continuation-in-part of Ser. No. 52,723, May 20, 1987, abandoned, which is a continuation of Ser. No. 818,993, Jan. 13, 1986, Pat. No. 4,639,262, which is a continuation-in-part of Ser. No. 622,217, Jan. 19, 1984, abandoned, which is a continuation-in-part of Ser. No. 568,717, Jan. 6, 1984, Pat. No. 4,572,728, which is a continuation-in-part of Ser. No. 511,270, Jul. 6, 1983, Pat. No. 4,498,303. This application Mar. 20, 1989, Ser. No. 325,766

Int. Cl.[5] E25J *1/00*

U.S. Cl. 62—10 **17 Claims**



1. A process for the recovery of carbon dioxide from a gaseous mixture containing water, noncondensible gas, and less than about 85% carbon dioxide, the process which comprises:

a. cooling the gaseous mixture to remove nearly all of the water;

b. compressing the cooled gaseous mixture to an elevated temperature and pressure and drying the compressed gaseous mixture to a dewpoint of not higher than about −85° F.;

c. cooling the compressed dried gas to liquefy said carbon dioxide therein and to separate the liquid carbon dioxide from the noncondensed gas; and

d. heating said noncondensed gas and expanding said noncondensed gas to produce kinetic energy and cooled noncondensed gas, and utilizing said kinetic energy elsewhere.

4,977,746

PROCESS AND PLANT FOR SEPARATING AIR AND PRODUCING ULTRA-PURE OXYGEN

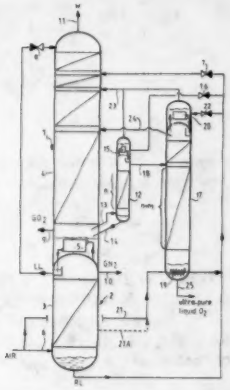
Maurice Grenier, Paris, and Philippe Mazieres, Montfermeil, both of France, assignors to l'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Jan. 19, 1990, Ser. No. 467,768

Claims priority, application France, Jan. 20, 1989, 89 00670

Int. Cl.[5] F25J *3/04*

U.S. Cl. 62—22 **16 Claims**



1. Process for producing ultra-pure oxygen by employing a principal double column air distillation apparatus comprising a medium pressure column and a low pressure column, said process further comprising:

employing a first auxiliary column, sending to the bottom of the first auxiliary column a first gas produced in a lower part of the low pressure column, and returning to the low pressure column liquid produced at the bottom of the first auxiliary column;

employing a second auxiliary column, distilling in the second auxiliary column a fluid produced at the top of the first auxiliary column, the ultra-pure oxygen being produced at the bottom of the second auxiliary column, and

heating the bottom of the second auxiliary column by condensing therein a heating gas available at the medium pressure at a level selected from a group consisting of the level of a lower part and the level of an intermediate part of the medium pressure column, and returning the condensate to the principal air distillation apparatus.

4,977,747

PROCESS AND CONTAINER FOR SUPPLYING SUPERCRITICAL CO_2

Serge Frejaville, Mejannes-Les-Ales; Philippe Mittelman, Fresnes; Claude Rajaonarivello, Nogent-sur-Marne, and Jean-Michel Naud, Nanterre, all of France, assignors to L'Air Liquide, Society Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Sep. 8, 1989, Ser. No. 404,452

Claims priority, application France, Sep. 8, 1989, 88 11738

Int. Cl.[5] F17C *7/02*

U.S. Cl. 62—50.1 **10 Claims**

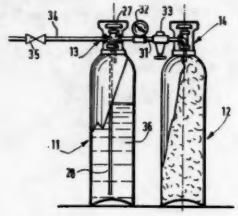
1. A process for supplying supercritical carbon dioxide comprising the following steps:

introducing into a container a quantity of liquid carbon dioxide at a first pressure

introducing into said container high-purity hydrogen at a second pressure, superior to said first pressure and to 120 bars, thereby providing in said container supercritical

carbon dioxide at said second pressure, containing less than 9% of dissolved hydrogen, surmounted by a gaseous charge of hydrogen

selectively drawing off said carbon dioxide



and discontinuing said carbon dioxide drawing off when the pressure in said container has fallen to a value not less than about 120 bars at ambient temperature.

4,977,748

VACUUM CONTAINER FOR CRYOGENICALLY COOLED ELECTRON DEVICE PACKAGING

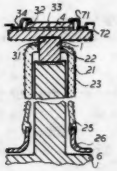
Heinz K. Diedrich, Via Scalpelli, 1, I-00019 Tivoli, (Rome), Italy

Filed Dec. 1, 1989, Ser. No. 444,891

Claims priority, application European Pat. Off., Dec. 5, 1988, 88120335.0

Int. Cl.[5] F25B *19/00*

U.S. Cl. 62—51.1 **11 Claims**



1. A vacuum container comprising:

(a) an external encasement constituting a part of the boundary of the evacuated portion of the container and consisting of a generally cylindrical peripheral wall member and a cover member joining said peripheral wall member in squared relationship;

(b) a center coldfinger module constituting another part of the boundary of the evacuated portion of the container and consisting of a tubular member, a solid body member and a tube member with said tubular member projecting axially into said peripheral wall member and having an open end which forms part of a hermetic seal to said tube member which joins said peripheral wall member in radially extending and generally coaxial relationship and with said solid body member being concentrically sealed into the other end of said tubular member and having two exposed faces in perpendicular relationship to the axis of said tubular member with the one face projected into the evacuated portion of the container and the other face situated in the non-evacuated portion within said tubular member; and

(c) a carrier board member having two parallel faces one of which being disposed on said solid body member within the evacuated portion of the container in sealing relationship; the vacuum container being characterised by the fact that:

(d) said solid body member consists of silicon,

(e) said carrier board member consists of silicon,

(f) said tubular member consists of a silicate glass,

(g) said solid body member to tubular member seal, and is a silicon-glass seal

(h) said carrier board member and solid body member disposition is a silicon-metal-silicon joint.

4,977,749

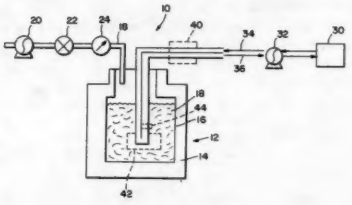
APPARATUS AND METHOD FOR PURIFICATION OF GASES USED IN EXCIPLEX (EXCIMER) LASERS

Jeffrey P. Sercel, 61 Nagle St., Nashua, N.H. 03060

Filed Apr. 25, 1989, Ser. No. 343,539

Int. Cl.[5] F25B *19/00*

U.S. Cl. 62—51.1 **8 Claims**



1. An apparatus for the purification of laser gases having impurities which comprises:

a Dewar vessel adapted to hold liquid nitrogen therein;

means to control the pressure of the nitrogen in the vessel and thereby the boiling point of the liquid nitrogen;

means to flow the laser gas to be purified into heat exchange relationship with the liquid nitrogen at a temperature above the liquification temperature of the gas and below the liquification temperature of the impurities to freeze and to precipitate the impurities; and

means to remove the impurities so precipitated.

4,977,750

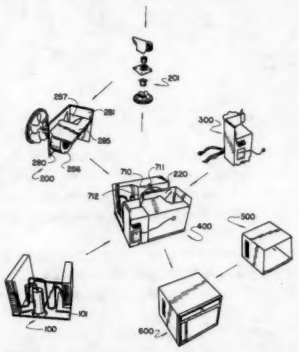
MODULAR ROOM AIR CONDITIONER AND METHOD FOR MAKING SAME

Frederick S. Metcalfe, deceased, late of 23 Dorset Ct., Somerset, N.J. 08873

Filed Aug. 22, 1988, Ser. No. 234,542

Int. Cl.[5] F25D *19/00*

U.S. Cl. 62—77 **7 Claims**



1. An air conditioner unit comprising a refrigeration system module, an air system module and a control system module, said refrigeration system module comprising a refrigeration

system comprising all refrigerant path components of said air conditioner unit including an interconnected compressor, an evaporator and a condensor each separately mounted on a base at the bottom of the module,

said air system module being mountable in a vertical direction to said refrigeration system module as a unit and including a first bulkhead portion fit between said evaporator and condensor, a motor arrangement mounted to said first bulkhead portion, a fan driven by said motor arrangement on the side of said first bulkhead portion toward said condensor, and a blower driven by said motor arrangement on the side of said first bulkhead portion toward said evaporator,

said air system module further comprising a horizontal bulkhead extending forwardly from said first bulkhead portion over said evaporator, and including a port extending through said horizontal bulkhead to direct air driven by said blower to flow into said evaporator unit below said horizontal bulkhead, then upwardly through said port and outwardly through said air conditioner,

said control system module being mountable in a vertical direction to said refrigeration system module as a unit and including a second bulkhead portion separable from said first bulkhead portion and positioned to adjoin said first bulkhead portion, a control panel, and control means for controlling said motor arrangement, whereby said air system module and control system module are separately mountable on said refrigeration system module,

said base of said refrigeration system module having first and second opposite edges, said evaporator being mounted adjacent said first edge and said condensor being mounted adjacent said second edge, said first and second bulkhead portions extending across said base intermediate said first and second edges, with said control panel adjacent said second edge thereof,

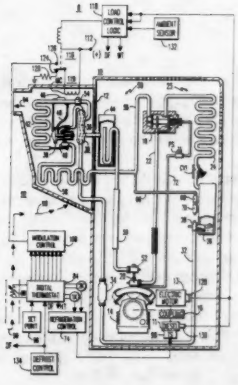
said control system module further comprising at least one partition, said second bulkhead portion, control panel and partition defining a housing for said control means.

4,977,751

REFRIGERATION SYSTEM HAVING A MODULATION VALVE WHICH ALSO PERFORMS FUNCTION OF COMPRESSOR THROTTLING VALVE

Jay L. Hanson, Bloomington, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Dec. 28, 1989, Ser. No. 458,206
Int. Cl.[5] G05D *23/32*
U.S. Cl. 62—81 **13 Claims**



1. A method of controlling a refrigeration system having a compressor, with the compressor being driven by a prime mover, comprising the steps of:

providing a controllable modulation valve which is open in the absence of electrical current flow,

disposing the modulation valve in the refrigeration system in a position which enables the modulation valve to control the amount of refrigerant flow to the compressor,

controlling the modulation valve in a predetermined range near a selected set point temperature according to a predetermined control algorithm, with the control algorithm otherwise allowing the modulation valve to remain open,

causing the modulation valve to provide a predetermined restriction in the flow of refrigerant to the compressor for a predetermined period of time following start-up of the compressor, overriding the control algorithm,

providing an overload signal in response to a predetermined overload condition of the prime mover,

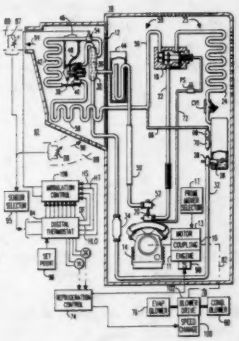
and causing the modulation valve to provide said predetermined restriction in the flow of refrigerant to the compressor in response to the overload signal, overriding the control algorithm.

4,977,752

TRANSPORT REFRIGERATION INCLUDING METHODS AND APPARATUS FOR OPTMIZING SAME

Jay L. Hanson, Bloomington, Minn., assignor to Thermo King Corporation

Filed Dec. 28, 1989, Ser. No. 458,278
Int. Cl.[5] F25B *27/00*
U.S. Cl. 62—115 **10 Claims**



1. In a method of operating a transport refrigeration system having a compressor selectively operable with either an electric- motor or an internal combustion engine, and including control for conditioning the air of a load space to a pre-selected set point via heating and cooling modes in response to a selected one of either a return air sensor or a discharge air sensor, the improvement comprising:

providing first, second, third, and fourth control algorithms,

selecting one of the first and second control algorithms when the compressor is operated with an internal combustion engine,

selecting one of the third and fourth control algorithms when the compressor is operated with an electric motor,

selecting one of the first and third control algorithms when the air is conditioned in response to a return air sensor,

and selecting one of the second and fourth control algorithms when the air is conditioned in response to a discharge air sensor.

4,977,753

METHOD FOR INDIRECT-EVAPORATIVE AIR COOLING

Valery S. Maisotsenko, Sadovaya, 21, kv. 7, Odessa, and Alexandr N. Gershuni, Ulyanovykh, 33, kv. 19, Kiev, both of U.S.S.R.

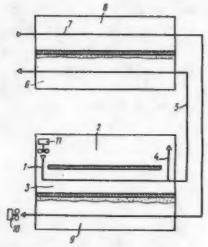
PCT No. PCT/SU88/00168, § 371 Date Apr. 25, 1990, § 102(e) Date Apr. 25, 1990, PCT Pub. No. WO90/02295, PCT Pub. Date Mar. 8, 1990

PCT Filed Aug. 26, 1988, Ser. No. 477,892

Claims priority, application U.S.S.R., May 12, 1987, 4235877

Int. Cl.[5] F25D *7/00*

U.S. Cl. 62—121 **1 Claim**



1. A method for indirect-evaporative air cooling, consisting in that air is cooled by passing its main stream **(1)** along a dry duct **(3)** and simultaneously passing an auxiliary air stream **(7)** in a countercurrent flow along a moist duct **(9)**, which is in heat-exchange interaction with said dry duct **(3)**, characterized in that the auxiliary air stream **(7)** is precooled by being passed along another dry duct **(8)**, which is in heat-exchange interaction with another moist duct **(6)** along which is passed countercurrently a part **(5)** of the precooled air taken up from the main stream **(1)**, flowing of the auxiliary air stream **(7)** being effected by sucking it out of the moist duct **(9)**.

4,977,754

NEXT-TO-BE-PURCHASED COLD BEVERAGE MERCHANDISER

Ronald D. Upton; Michael A. Branz, and Edmund S. Richardson, all of Spartanburg, S.C., assignors to Specialty Equipment Companies, Inc., Berkeley, Ill.

Filed May 1, 1990, Ser. No. 517,345

Int. Cl.[5] A47F *3/04*

U.S. Cl. 62—248 **20 Claims**

1. A refrigerated merchandiser for single serving beverage containers intended for immediate consumption, the merchandiser comprising:

(a) a refrigerated compartment for holding items to be cooled;

(b) means for allowing selective access to said compartment;

(c) a housing which is heat insulated from said compartment;

(d) a condenser mounted for selective disposition into and out of said housing;

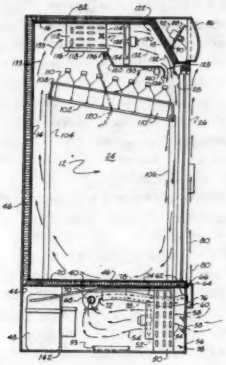
(e) a compressor mounted for selective disposition into and out of said housing;

(f) a condenser fan for operating in conjunction with the operating cycle of said compressor;

(g) means for transferring warmed air onto said selective access means to continuously defog said selective access means;

(h) an evaporator disposed inside said compartment; and

(i) means for circulating the cooled air leaving said evaporator so that the path of cool air circulation begins by moving toward said selective access means before said cooled air moves toward any other portion of said compartment.



4,977,755

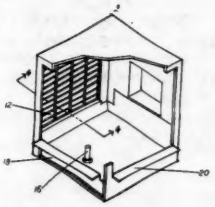
EVAPORATIVE COOLER LINER

R. Mark Tulley, 1509 Martha NE., Albuquerque, N. Mex. 87112

Filed Nov. 16, 1989, Ser. No. 437,532

Int. Cl.[5] F28D *5/00*

U.S. Cl. 62—304 **8 Claims**



1. A waterproof liner for use with a side draft evaporative cooler having a base, preselected base dimensions, side walls extending upwardly therefrom, and removable pads, the bottoms of which pads engage the tops of the side walls, said liner comprising:

a flexible waterproof tub-shaped article, fittable into the base of the evaporative cooler, said article comprising a liner bottom portion cuttable by an installer to provide an aperture for an overflow drain pipe, and liner side walls which in combination with said bottom portion, line and thereby waterproof of the base of the cooler; and

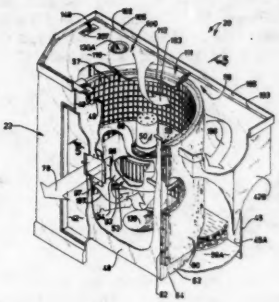
flap retention assistance means attached to said liner sidewalls of said article, said flap retention assistance means being extendible over the sidewalls of the cooler base, said flap retention assistance means being engageable with the removable pads when the removable pads are disposed in place for assisting and retaining said article in position in the cooler base.

4,977,756

EVAPORATIVE AIR COOLER

James A. Brock, Alexander, Ark., assignor to Walton Enterprises, Inc., Bentonville, Ark.

Filed Jan. 16, 1990, Ser. No. 465,996
Int. Cl.[5] F28D 5/00
U.S. Cl. 62—314 36 Claims



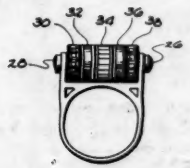
14. An evaporative air cooler comprising:
a cabinet adapted to be disposed upon a supporting surface;
an air inlet and an air outlet;
evaporative pad means within said cabinet for cooling air passing therethrough;
means for wetting said evaporative pad means;
cage means disposed within said cabinet for supporting said evaporative pad means;
first and second separate compartments defined within said cage means;
fan means disposed in one of said first or second cage compartments for moving air through said cooler;
motor means located in the other of said first and second compartments for driving said fan means;
a boundary volume defined between said cage means and said cabinet; and,
an air path commencing with said inlet, then entering one of said first or second cage compartments, passing through said evaporative pad means into said boundary volume, returning through said evaporative pad means into the other of said first or second cage compartments, and exiting said evaporative cooler through said outlet.

4,977,757

JEWLERY WITH ROTATABLE ORNAMENTATION

Zuri Mesica, Studio City, Calif., and Igal Golan, Tel Aviv, Israel, assignors to Prestige Collection, Inc., Los Angeles, Calif.

Continuation of Ser. No. 401,564, Aug. 28, 1989, abandoned, which is a continuation of Ser. No. 40,890, Apr. 20, 1987, abandoned. This application Feb. 5, 1990, Ser. No. 477,184
Int. Cl.[5] A44C 9/00
U.S. Cl. 63—15 11 Claims



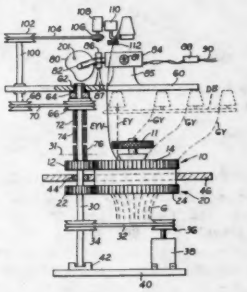
1. A ring comprising, in combination:
(a) a member adapted to receive the finger of a wearer;
(b) an elongated spindle transversely supported by said member;
(c) a plurality of separable ornamental wheels freely rotatably carried by said spindle; and
(d) fastener means for releasably securing the spindle to the member so that the wearer may readily release the spindle from the member in order selectably to substitute a different ornamental wheel or to rearrange the order of existing ornamental wheels, and then resecure the spindle to the member.

4,977,758

KNITTING MACHINES

Terence R. M. Muir, Nottingham, England, assignor to Smith & Nephew Textiles Limited, England

Continuation-in-part of Ser. No. 94,338, Sep. 8, 1987, abandoned. This application Dec. 13, 1989, Ser. No. 450,592
Int. Cl.[5] D04B 9/06, 15/50, 15/88
U.S. Cl. 66—27 10 Claims



1. A control system for a circular knitting machine the control system including a main drive shaft, and means for varying the rate at which yarn is supplied to the machine in a controlled manner over a period of time such that the shape of the workpiece is controlled by the rate of yarn feed, said means for varying the rate at which yarn is supplied to the machine including a rotatable profile cam, and a variable speed pulley fixed on said main drive shaft for rotation therewith, and wherein said rotatable profile cam acts in a direct linear manner upon said variable speed pulley to control the yarn feed supply rate.

4,977,759

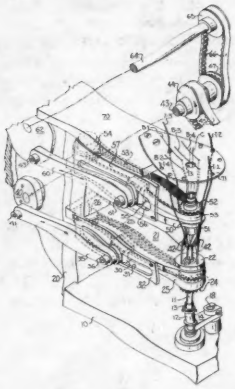
CIRCULAR WARP KNITTING MACHINE

Davis C. Jencks, Seekonk, Mass., assignor to New England Overseas Corporation, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 182,497, Apr. 18, 1988, Pat. No. 4,838,043. This application Jun. 1, 1989, Ser. No. 360,102
Int. Cl.[5] D04B 25/02
U.S. Cl. 66—81 5 Claims

1. In a circular warp knitting machine including a plurality of vertically reciprocated needles, and yarn guide means supported for clockwise and counterclockwise reciprocal movement above said needles to direct yarns to said needles, the combination therewith of improved drive means for imparting clockwise and counterclockwise reciprocal movements to said yarn guide means, said improved drive means comprising
(a) endless belt means drivingly connected to said yarn guide means,
(b) crank arm means drivingly connected at one end to said endless belt means, and
(c) rotary drive means connected to the opposite end of said crank arm means for imparting continuous longitudinal

reciprocation to said crank arm means and to thereby impart reciprocating movement to said endless belt means



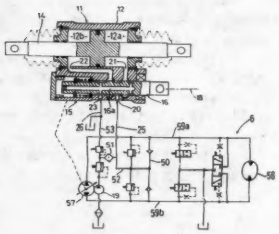
and to said yarn guide means drivingly connected to said endless belt means.

4,977,760

SPEED CONTROL SYSTEM FOR A WORKING VEHICLE

Shoso Ishimori, and Mikio Ishida, both of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Dec. 9, 1988, Ser. No. 281,716
Claims priority, application Japan, Dec. 15, 1987, 62-316868; Jul. 20, 1988, 63-180612; Jul. 20, 1988, 63-95777[U]
Int. Cl.[5] F16H 39/46; B60K 20/14
U.S. Cl. 60—444 13 Claims



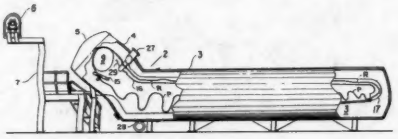
1. A speed control system for a working vehicle comprising:
a hydrostatic transmission (6) for propelling the vehicle, said hydrostatic transmission including a control shaft (9) for varying a swash angle,
a control arm (10) extending from said control shaft and defining a fork portion in a free end thereof,
manual control means (17) for manually controlling said hydrostatic transmission (6),
a hydraulic cylinder (11) including a cylinder case (12) operatively connected to said control shaft (9) for varying the swash plate angle of said hydrostatic transmission (6),
engaging means (12c) in an outer lateral wall of said cylinder case (12) for engaging said fork portion of the control arm and transmitting movement of the cylinder case to said control arm,
a piston rod (14) fixed to a case (5) containing said hydrostatic transmission (6), and
a control valve (15) fixed to said cylinder case (12) and including a spool (16) operatively connected to said manual control means (17), said cylinder case (12) being shiftable following a shift of said spool (16).

4,977,761

LIQUOR APPLYING NOZZLE FOR A TEXTILE DYEING MACHINE

George G. Hacker; James K. Turner, both of Stanley, and Charles R. Hornbuckle, Lincolnton, all of N.C., assignors to Gaston County Dyeing Machine Co., Stanley, N.C.

Filed Jan. 16, 1990, Ser. No. 465,465
Int. Cl.[5] D06B 3/28
U.S. Cl. 68—177 19 Claims



1. In a textile dyeing machine in which textile material, such as fabric, is circulated in rope form through a dyeing chamber and wherein the rope progresses in folded plug form through the chamber and is withdrawn from the leading end of the plug in a path extending over a lifter reel, through a liquor applying nozzle and a return passage from which it reforms as the trailing end of the progressing folded plug, said liquor applying nozzle comprising a frame surrounding the path of the textile rope and having an opening through which the textile rope passes, said frame being hollow for distribution of liquor therethrough,

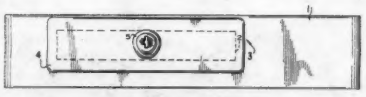
means for introducing treating liquor through said frame into said opening onto the textile rope, said liquor introducing means including a lower orifice extending transversely across the opening along the bottom thereof for flow of liquor therethrough into contact with a textile rope, said opening being defined by an elongated, generally straight, transversely extending surface forming the textile rope supporting bottom of the opening, a transversely extending top surface spaced from the bottom, and a pair of spaced, upstanding, generally straight side surfaces, said bottom and generally straight side surfaces combining to facilitate disposition of the textile rope in generally open condition across the transverse extent of the opening.

4,977,762

LOCKING DEVICE FOR A VIDEO CASSETTE RECORDER AND/OR PLAYER

Wayne V. Dennis, 18975 Collins Ave. #C110, North Miami, Fla. 33160

Filed Jun. 9, 1989, Ser. No. 364,789
Int. Cl.[5] E05B 73/00
U.S. Cl. 70—14 9 Claims



1. Locking device for video cassette recorders and players having a panel with an opening formed therein in which a video cassette is to be inserted and a movable cover closing the opening, comprising a lock insertable into the opening operable from outside the panel, and engagement means movable by said lock between a position engaging an edge of the cover and preventing the locking device from being removed from the

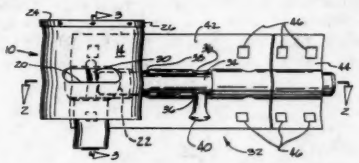
opening and a position disengaging the edge of the cover and permitting the locking device to be removed from the opening.

4,977,763

PADLOCK PROTECTOR

Hestel D. Sewell, 4525 W. 57th St., North, Wichita, Kans. 67204

Filed Jul. 30, 1990, Ser. No. 560,346
Int. Cl.[5] E05B 67/38
U.S. Cl. 70—54 6 Claims



1. A padlock protector for use with a padlock in securing both dead bolt door locks and hasp and staple latches comprising:

a thin-walled container having side walls one closed end and one open end, the container is sized to receive and contain a padlock and shackle through the open end;

a first slot means in a side wall sized to receive the staple of a conventional hasp and staple latch;

spacer means surrounding the first slot and attached to the container for limiting the extension of the staple inside the container for engagement by the padlock shackle; and

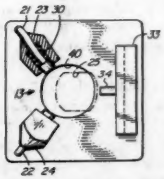
second slot means in a side wall having a radius, the slot means sized in width to receive a dead bolt door lock with a lateral shackle engaging hole therein which is engageable by the padlock shackle from within the container.

4,977,764

LOCK BOX

Larry G. Runnalls, 25149 - 72 Avenue, Aldergrove, British Columbia, Canada V0X 1A0

Filed Dec. 13, 1989, Ser. No. 449,760
Int. Cl.[5] E05B 65/52
U.S. Cl. 70—63 7 Claims



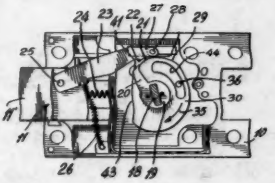
1. A substantially rectangular lock box comprising a housing having an open side, a substantially rectangular lid removably mounted on said housing on said open side, a ridge on said housing extending around the inner periphery of said housing adjacent said open side, a retainer on one side of said lid complementary to said ridge, said retainer being operable to extend beneath said ridge and a pair of pins on an opposite side of the lid and each extending towards a corner of the lid on said opposite side of the lid, wherein each pin is movable between an extended position beneath said ridge when said lid is mounted on said housing and a retracted position to allow removal of said lid from said housing.

4,977,765

DELAY ACTION ELECTRONIC TIMER LOCK WITH AUTOMATIC CANCELLATION CAM

Claude Legault, 4960 Lalande, Pierrefonds, Quebec, Canada (H8Y 1V8), and Pierre Deguire, 10 Lillian Way, R.R. #1, Kanata, Ontario, Canada

Filed Jun. 4, 1990, Ser. No. 532,899
Int. Cl.[5] E05B 43/00
U.S. Cl. 70—268 12 Claims



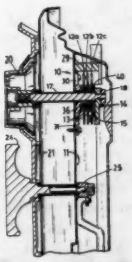
1. A delay action time lock comprising a lock housing having a spring action bolt, a retracting cam having a retracting means for engagement with a bolt retracting lever for retracting a locking end of said bolt in said housing, retracting cam actuating means disposed outside said housing for turning said cam, a motor actuated support cam for normally supporting said bolt retracting lever in a disengaged position with said retracting cam, switch means associated with said retracting cam for enabling a timer circuit to initiate a first preset time delay count, an electric motor connected to said retracting lever support cam, said timer causing said motor to be energized after said preset time delay whereby said motor will turn said support cam in a first direction to cause said retracting lever to move to an engageable position for engagement by said retracting cam, said timer circuit initiating a second preset time delay count after terminating said first count after which said motor is energized to cause said support cam to turn in a reverse direction to support said retracting lever at its disengaged position whether said retracting lever is retracted or not by said retracting cam.

4,977,766

UNIVERSAL LOCK MOUNT

Patrick J. Beattie, West Henrietta; Andrew L. Oliveri, and Richard J. Sylvester, both of Rochester, all of N.Y., assignors to John D. Brush & Co., Inc., Rochester, N.Y.

Filed Jan. 2, 1990, Ser. No. 459,452
Int. Cl.[5] E05B 15/14
U.S. Cl. 70—326 18 Claims



1. A universal lock mount for supporting lock components to be assembled prior to installation in a safe or the like, said components including a friction washer and a retaining cap, said universal mount comprising:

an integral resin structure forming a mounting plate portion and a bushing portion having

a cylindrical bearing surface with an axial keyway for receiving and supporting said components, and

a step formed at its outer end for receiving said retaining cap,

said mounting plate portion being configured to receive fasteners for installing said assembled lock components, and

said integral structure also having a lock spindle passageway therethrough concentric with said cylindrical bearing surface.

4,977,767

HIGH-SECURITY FLAT KEY AND LOCK THEREFOR

Kurt Prunbauer, Herzogenburg, Austria, assignor to Evva-Werk Spezialerzeugung Von Zylinder- und Sicherheitsschlossern Gesellschaft M.B.H. & Co. Kommanditgesellschaft, Vienna, Austria

Filed Mar. 24, 1989, Ser. No. 328,469

Claims priority, application Austria, Mar. 31, 1988, 861/88

Int. Cl.[5] E05B *19/06*

U.S. Cl. 70—406 **16 Claims**

1. A flat key having a blade formed with a pair of opposite edges, with a pair of opposite faces between the edges, and with an outer-end tip, the blade further being formed with:

a pair of relatively shallow, outwardly open, and generally parallel but spaced grooves formed in at least one of the faces extending generally longitudinally in a nonstraight path from the tip; and

a relatively deep and outwardly open groove formed in the one face mainly between the shallow grooves and extending generally longitudinally in a nonstraight path from the tip generally nonparallel to the shallow grooves.

4,977,768

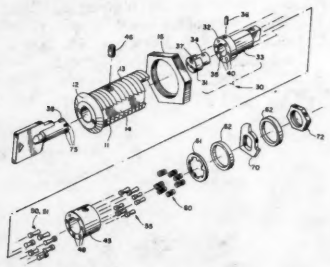
PICK-RESISTANT AXIAL SPLIT-PIN TUMBLER LOCK

Donald Embry, Cloverport, Ky., assignor to 775 Corporation, Norcross, Ga.

Continuation of Ser. No. 269,057, Nov. 9, 1988, abandoned. This application Nov. 1, 1989, Ser. No. 430,063

Int. Cl.[5] E05B *27/08*

U.S. Cl. 70—491 **12 Claims**



1. A pick-resistant axial split-pin tumbler lock, comprising:

a rotatable operating element and a fixed element in contiguous, end-to-end relationship thereto, said operating element and fixed element being configured to define a shear plane therebetween and having aligned bores therein extending on opposite sides of the shear plane;

aligned code pins and drive pins slidable across the shear plane in the bores in the elements, said code pins and drive pins being in end-to-end abutting engagement with one another and normally positioned so that the points of contact between the pins are out of alignment with the shear plane, but being adapted to be moved to positions where the points of contact between the code pins and drive pins are aligned with the shear plane to permit the operating element to be moved with respect to the fixed element to open the lock; and

said code pins and drive pins each having an elongate body tapering inwardly from one end thereof to an enlarged head on the other end, and dimensioned so that they are enabled to tilt in the bores when they extend or project across the shear plane and the operating element is rotated with respect to the fixed element, whereby the pins will bind or hang up in the respective bores in any number of axial positions during an attempt to pick the lock, giving multiple and differing false readings of an unlocked condition of the lock and rendering it pick resistant.

4,977,769

ROLLING MACHINE WITH EXCHANGEABLE ROLLING TOOLS

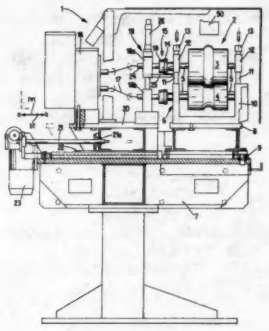
Gerhard Krückels, Königsberger Strasse 2, D-7860 Schopfheim, Fed. Rep. of Germany

Filed Oct. 25, 1989, Ser. No. 427,142

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836286

Int. Cl.[5] B21B *37/00, 35/14, 31/08*

U.S. Cl. 72—26 **24 Claims**



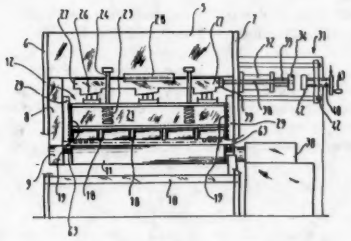
1. A rolling machine comprising a tool supporting frame; at least one pair of complementary rolling tools rotatably journalled in said frame and arranged to shape sheet material fed between the rolling tools, the tools of said one pair including an upper tool and a lower tool and the tools of said at least one pair comprising a pair of first clutch elements; means for separably supporting said frame in a predetermined position; a mobile support adjacent said frame and including a pair of rotary second clutch elements; means for displacing one clutch element of one of said pairs of clutch elements with reference to the other clutch element of said one pair of clutch elements by an actuatable drive means, each of said second clutch elements being in torque-transmitting engagement with and being disengageable from a different one of said first clutch elements; means for automatically arresting said displacing means when said one clutch element of said one pair of clutch elements registers with the respective clutch element of the other pair of clutch elements; clutch drive means for said second clutch elements mounted on said mobile support; and means for moving said support toward and away from said frame to disengage said second clutch elements from the respective first clutch elements and move said clutch drive means with said support as a result of movement of said support away from said frame.

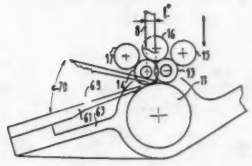
4,977,770

AUTOMATABLE BENDING MACHINE HAVING CRENELATED ROLLS

Michel Gravier, Aubergenville, France, assignor to Jammes Industrie S.A., Cebazat, France

Filed Sep. 15, 1989, Ser. No. 407,655
Claims priority, application France, Oct. 5, 1988, 88 13381
Int. Cl.[5] B21D 5/14
U.S. Cl. 72—175 7 Claims





1. A bending machine adapted to shape a deformable flat sheet into a cone or cylinder, said machine comprising:

(a) a driven rotatable support roll,

(b) an assembly of rolls movable relative to the support roll and including a pair of cooperating crenelated rolls penetrating into each other and having parallel axes, the said machine including a comb having an array of teeth which extend tangentially to the support roll to provide a guide table for the sheet to be bent which is fed between the support roll and the crenelated rolls, said teeth having end notches which can enter the space between opposing edges of the bent sheet and thereby separate these edges, and

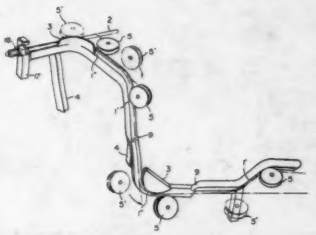
(c) a train of three press rolls subjecting said crenelated rolls to pressure and having axes parallel to the axes of the crenelated rolls, namely a central press roll which simultaneously presses on each of the crenelated rolls and lateral rolls, each of which is pressed against a respective crenelated roll, the line of contact between the press rolls and the crenelated rolls being located above the plane defined by the axes of the crenelated rolls, the axes of the press rolls and of the crenelated rolls being substantially fixed with respect to each other, said comb serving as a guide surface for the flat sheet before its passage between the crenelated and press rolls, and wherein the said comb is supported by a frame articulated at each of its ends around the support roll.

4,977,771

DEVICE FOR BENDING THIN METALLIC PIPE

Sadao Kimura, Numazu, Japan, assignor to USUI Kokusai Sangyo Kaisha Ltd., Japan

Filed Dec. 22, 1989, Ser. No. 455,991
Claims priority, application Japan, Dec. 30, 1988, 58-332185
Int. Cl.[5] B21D 7/02
U.S. Cl. 72—218 9 Claims



1. A device for bending a thin metallic pipe into a shape having at least first and second bends, each said bend defining a bending plane and a radius of curvature, said device comprising: a stationary mold form having a configuration substantially coinciding with the shape to which the metallic pipe is bent throughout the entire length thereof; at least first and second elongated bending sections formed on the stationary mold form, said first bending section including, in its longitudinal direction, a first guide surface having a radius of curvature smaller than the radius of curvature of the first bend of the metallic pipe said first guide surface extending in a cross direction substantially normal to the bending plane of the first bend of the metallic pipe and said second bending section including a second guide surface running substantially parallel to said bending plane of the second bend in the metallic pipe and a guide member provided on said stationary mold form in a direction substantially normal to said second guide surface and having a radius of curvature smaller than that of the second bend of the metallic pipe; each said bending section having a bending member located radially outside said stationary mold form and movable toward the stationary mold form so that the metallic pipe is bent along said first guide surface at said first bending section, and subsequently along said second guide surface and said guide member at said second bending section; a rotor rotatably attached to said stationary mold form at a position corresponding to at least one of said bending sections and adapted to rotate the respective bending members; an actuator for operating said rotor through a wire; and means for automatically returning the rotor and the associated bending member to the position radially outside the stationary mold form.

4,977,772

METHOD AND APPARATUS FOR FORMING REFORMING AND CURLING SHELLS IN A SINGLE PRESS

Joseph D. Bulso, Jr., Canton, and James A. McClung, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Continuation-in-part of Ser. No. 239,948, Sep. 2, 1988, Pat. No. 4,903,521. This application Feb. 26, 1990, Ser. No. 485,180
Int. Cl.[5] B21D 22/00
U.S. Cl. 72—336 23 Claims

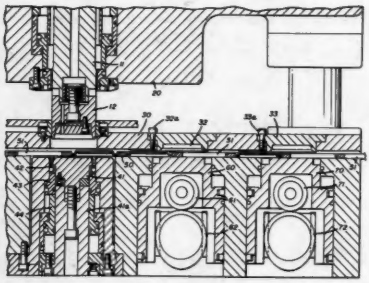
1. A method of forming container end panels from material fed into a press, comprising the steps of:

(a) clamping the material and forming a blank therefrom;

(b) forming a cup from the blank in a continuous press stroke;

(c) imparting a preliminary end panel configuration to said cup in the same continuous press stroke;

(d) passing the cup through the die used for forming the cup prior to step c; and



(e) transferring the cup normally with respect to the direction in which the material is fed into the press.

4,977,773

DOUBLE ACTION DIE SET FOR CLOSED FORGING

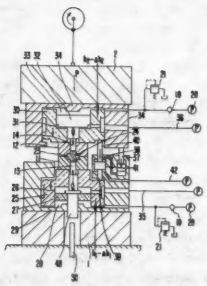
Yoshiki Mito; Minoru Sueda; Hiroshi Shiota, and Shozo Tashiro, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1989, Ser. No. 403,489

Claims priority, application Japan, Sep. 13, 1988, 63-227420

Int. Cl.[5] B21J *9/12*

U.S. Cl. 72—353.6 **12 Claims**



1. A double action die set for closed forging adapted for use with a reciprocating press having a stationary base and a slide, comprising:

a hollow stationary die adapted to be fixed to the stationary base and having a first chamber formed therein;

a first hollow outer piston disposed within said hollow stationary die;

a first metal mold supported by said first hollow outer piston;

a first inner piston slidably mounted within said first hollow outer piston;

a first punch supported by said first inner piston;

said first chamber being adapted to contain hydraulic fluid therein which acts against both said first inner piston and said first outer piston;

a hollow movable die adapted to be fixed to the slide and having a second chamber formed therein;

a second hollow outer piston disposed within said hollow movable die;

a second metal mold supported by said second hollow outer piston;

a second inner piston slidably mounted within said second hollow outer piston;

a second punch supported by said second inner piston;

said second chamber being adapted to contain hydraulic fluid therein which acts against both said second inner piston and said second outer piston;

hydraulic pressure producing means, comprising a primary control piston, for producing a hydraulic pressure due to movement of said primary control piston in response to the pressing of one of said stationary die and said movable die against the other of said stationary die and said movable die; and

pressing means, comprising a secondary control piston which has a double piston rod extending therefrom in two opposing directions and is connected to said primary control piston through a closed hydraulic line such that said secondary control piston is caused to move in the same direction as said primary control piston, for pressing respectively against said first outer piston and said second outer piston in response to the production of hydraulic pressure by said hyraulic pressure producing means.

4,977,774

PRESS DEVICE

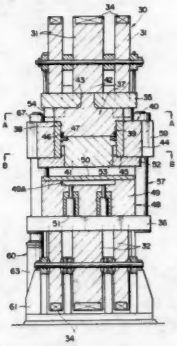
Akira Asari; Kuniaki Kanda, both of Kobe; Hiroshi Okamoto, Ashiya, and Masakazu Ueda, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Nov. 30, 1989, Ser. No. 443,493

Claims priority, application Japan, Dec. 12, 1988, 63-314498

Int. Cl.[5] B21D *37/12*

U.S. Cl. 72—456 **7 Claims**



1. A press device, comprising:

a press frame for transmitting a press thrust;

a press force generating means disposed in said press frame and including a lid member secured to said press frame, a cross head having a cylinder chamber in which said lid member is fitted for sliding movement in an axial direction of said press device and having a blank holder at an end face thereof remote from said lid member, and a pressurizing member fitted for sliding movement in a portion of said cylinder chamber of said cross head remote from said lid member in the axial direction of said press device relative to said cylinder chamber;

a shaping element means disposed in said press frame in an opposing relationship to said press force generating means and having a shaping portion in which said pressurizing member is fitted;

a guide means connected to said cross head for guiding said cross head for sliding movement in the axial direction of said press device; and

a cross head actuating means connected to said cross head for moving said cross head having said blank holder in the

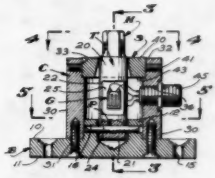
axial direction of said press device under the guidance of said guide means independently of said pressurizing member.

4,977,775

TORQUE TRANSDUCER

Bosko Grabovac, Arcadia, and Zlatko Kurtovic, Walnut, both of Calif., assignors to Consolidated Devices Inc., City of Industry, Calif.

Filed Dec. 26, 1989, Ser. No. 456,725
Int. Cl.[5] G01L *25/00*
U.S. Cl. 73—1.00 C **5 Claims**



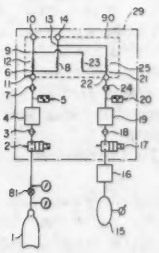
1. A torque transducer comprising a horizontal base plate, an elongate vertically extending torsion member with elongate upper and lower end portions and an elongate axially extending central deflection portion, pivot means couple the lower end portion of the member in rotary driving engagement to the plate for pivotal movement of the member about a horizontal axis that is parallel with a first radial plane through the transducer and normal to a second radial plane through the transducer, a tool engaging head at and projecting up from the upper end of the member, the deflecting portion of the member is rectangular in cross-section with its major cross-sectional axis normally parallel with said first radial plane and having oppositely disposed strain gauge supporting surfaces in planes normally parallel with said first radial plane, strain gauges fixed to the mounting surfaces and connected with a related electrical circuit remote from the transducer, a case carried by the plate and surrounding the member, stop means on the case engageable with the upper end portion of the member and stopping lateral displacement and pivoting of the member through said second radial plane.

4,977,776

GAS MIXING DEVICE AND GAS ANALYZER MAKING USE OF THE SAME

Isao Shindo; Ryuji Tao, both of Katsuta, and Kyoichi Ozawa, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Division of Ser. No. 201,738, Jun. 3, 1988, Pat. No. 4,905,497.
This application Sep. 8, 1989, Ser. No. 404,404
Claims priority, application Japan, Jun. 5, 1987, 62-139792
Int. Cl.[5] G01N *31/00*
U.S. Cl. 73—1 G **18 Claims**



1. A gas mixing device for mixing a plurality of gases, comprising:

a substrate having a plurality of grooves formed thereon by etching including a plurality of inlet grooves and at least one outlet groove, each of said inlet grooves being branched into a plurality of gas passage grooves, and each of said at least one outlet groove being connected with at least two of said inlet grooves through said gas passage grooves, and said inlet grooves and said at least one outlet groove having dimensions of cross-section greater than said gas passage grooves, and said gas passage grooves having width and depth dimensions that are smaller than 1 mm;

a plate having a flat smooth surface, a plurality of inlet ports each communicating with a respective one of said inlet grooves and through each of which a gas to be mixed is introduced from respective gas sources, and at least one outlet port which is to be communicated with a respective said at least one outlet groove and through which a gas mixture is discharged, said plate being bonded at said flat smooth surface to said substrate to define therebetween gas passages which have predetermined flow resistances and are constituted by said gas passage grooves, whereby gases to be mixed together are introduced from said inlet ports into said at least one outlet groove and are mixed together into the gas mixture; and

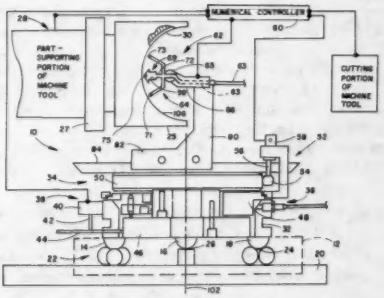
pressure regulating means for each of said inlet ports for maintaining the pressures of a plurality of gases to be supplied to said inlet grooves substantially at the same level.

4,977,777

NON-CONTACT CONTOUR GAGE

Lothar F. Bieg, Louisville, Colo., assignor to The United States of America as Represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 9, 1989, Ser. No. 308,074
Int. Cl.[5] G01B *13/16*
U.S. Cl. 73—37.5 **16 Claims**



1. A probe apparatus for measuring the contour of a surface, comprising:

a probe assembly, comprising

(1) a measuring probe comprising measuring nozzle means for directing a measuring fluid stream toward the surface being measured, and

(2) means for maintaining said measuring probe substantially perpendicular to the surface being measured, said perpendicular maintaining means comprising guide nozzle means for directing guide fluid streams toward the surface being measured, whereby said guide fluid streams, interacting with the surface being measured, maintain said measuring fluid stream perpendicular to the surface being measured;

pivot means for supporting said probe assembly;

means for supporting said pivot means, whereby said supporting means pivotally supports said probe assembly as

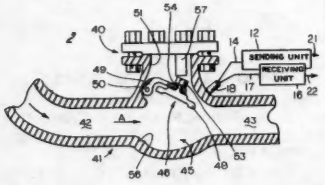
said perpendicular maintaining means interacts with the surface being measured.

4,977,778

CHECK VALVE TESTING SYSTEM

Steven Nafziger, Chamblee, and John A. McMennamy, Marietta, both of Ga., assignors to Movats Incorporated, Marietta, Ga.

Continuation of Ser. No. 353,807, May 18, 1989, abandoned, which is a continuation of Ser. No. 924,837, Oct. 29, 1986, abandoned. This application Jan. 22, 1990, Ser. No. 467,911
Int. Cl.[5] G01N *29/00*
U.S. Cl. 73—597 9 Claims



1. Method of testing the operating condition of a fluid flow check valve including a movable check valve disk positioned in a check valve chamber defined by a check valve casting, said method comprising the steps of:

removably and temporarily locating a sound wave sending unit and a sound wave receiving unit at the check valve;

directing a sound wave at and through the check valve casting and at the check valve disk;

receiving a plurality of reflected sound waves from reflection of the directed sound wave off elements of the check valve;

generating an isolated signal from the first reflected sound wave which, after a selected delay, subsequent to the directing of the sound wave, has an energy level above a predetermined minimum level, said isolated signal corresponding to a sound wave reflected off the check valve disk,;

counting the lapsed time from the end of the selected delay until the generation of the isolated signal;

creating a signal corresponding to the lapsed time from the end of the selected delay until the generation of the isolated signal;

collecting the signal corresponding to the lapsed time from the end of the selected delay until the generation of the isolated signal;

repeating the above directing, receiving, generating, counting, creating, and collecting steps at selected intervals over a period of time; and

plotting a lapsed time versus real time curve which reveals changes in position of the check valve disk with respect to real time,

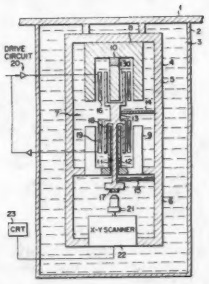
whereby the operating condition of the check valve with respect to degradation and wear of check valve elements can be determined and analyzed.

4,977,779

ULTRASONIC MICROSCOPE HAVING A FOCUSING MECHANISM

Koichi Karaki, Hino; Mitsugu Sakai, and Yasuo Sasaki, both of Hachiooji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 14, 1989, Ser. No. 381,136
Claims priority, application Japan, Jul. 21, 1988, 63-182679
Int. Cl.[5] G01N *29/00*
U.S. Cl. 73—606 9 Claims



1. An ultrasonic microscope, comprising:

a housing for containing a cryogenic liquid;

a frame provided within said housing;

support means secured to said frame, for supporting a sample so that the sample is immersed in the cryogenic liquid;

an acoustic lens located within the housing and immersed in the cryogenic liquid, for applying an ultrasonic beam to the sample supported by said support means;

a scanner for causing said acoustic lens to scan the sample two-dimensionally;

a voice coil device supported by said frame, for moving said support means in response to a drive current, and for fixing a distance between said acoustic lens and the sample;

a drive circuit for supplying a drive current to said voice coil device; and

control means associated with said voice coil device for generating an electromotive force (EMF) in response to movement of said support means, and for supplying a current caused by said EMF to said drive circuit, wherein the movement of said support means is controlled by said current to maintain the sample at a desired position with respect to said acoustic lens.

4,977,780

ULTRASONIC PROBE DEVICE

Kaoru Machida; Yusichi Kikuchi; Masayuki Takano, and Noriyoshi Kobayashi, all of Otawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 325,049, Mar. 16, 1989, abandoned, which is a continuation of Ser. No. 116,247, Nov. 3, 1987, abandoned. This application Mar. 27, 1990, Ser. No. 500,115
Claims priority, application Japan, Nov. 6, 1986, 61-264774; Nov. 25, 1986, 61-280296
Int. Cl.[5] G01N *29/04*
U.S. Cl. 73—644 6 Claims

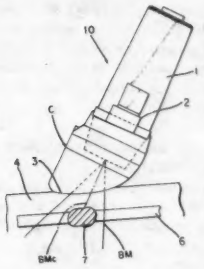
1. An ultrasonic probe device comprising:

an ultrasonic probe for transmitting ultrasonic wave beams toward a target region in a body under examination and scanning it in a planar form to form a scanning plane, said probe having a central axis in said scanning plane substantially colinear with a central line of said ultrasonic beams in said scanning plane; and

an ultrasonic coupler mounted on said ultrasonic probe and

having a contact surface for contacting a surface of the body under examination;

wherein said contact surface defines a convex curved surface in said scanning plane, and wherein a line tangent to



said convex curved surface at an intersection of said central line and said convex curved surface forms an oblique angle with respect to said central axis of said ultrasonic probe, said contact surface crossing at a right angle with said scanning plane.

4,977,781

VORTEX FLOW METER

Masao Misumi, and Koji Atsumi, both of Tokyo, Japan, assignors to Oval Engineering Co., Ltd., Tokyo, Japan

Division of Ser. No. 283,656, Dec. 13, 1988, Pat. No. 4,891,989, which is a division of Ser. No. 24,294, Mar. 10, 1987, Pat. No. 4,838,092. This application Aug. 24, 1989, Ser. No. 398,197

Claims priority, application Japan, Mar. 15, 1986, 61-037995; Mar. 15, 1986, 61-037996; Mar. 16, 1986, 61-037828; Mar. 16, 1986, 61-057766; Mar. 17, 1986, 61-058975; Nov. 19, 1986, 61-178079

Int. Cl.[5] G01F 1/32

U.S. Cl. 73—861.22 14 Claims

1. A vortex generator for measuring fluid flow in an elongated circuit having a central axis, comprising an upstream and a downstream vortex generator disposed transversely in said conduit, said upstream vortex generator having an upstream side and a downstream base side, said downstream vortex generator having a downstream side and an upstream base side, said upstream and downstream base sides being substantially flat and parallel surfaces which are spaced from one another, and plate means disposed in said space between said base sides, said plate means having one plate side spaced from said upstream base side and another plate side spaced from said downstream side, said plate means having a trapezoidal cross-sectional configuration.

4,977,782

DEVICE FOR MEASURING THE TORQUE OF A VALVE MOVED BY AN ACTUATOR

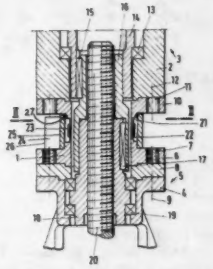
Hans Stöhr, Mannheim, and Lothar Mehr, Lampertheim, both of Fed. Rep. of Germany, assignors to ABB Reaktor GmbH, Mannheim, Fed. Rep. of Germany

Filed Jun. 21, 1989, Ser. No. 369,471

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820835

Int. Cl.[5] G01L 5/00, 3/10

U.S. Cl. 73—862.29 3 Claims



1. Torque measuring assembly, comprising an actuator having a housing, a valve being moved by said actuator and having a housing and a valve stem, a flanged bush interconnecting said housings and having a cylindrical part acting as a torque tube, at least one strain gauge for measuring the torque of said valve, said valve stem passing through said flanged bush and defining an annular space therebetween, and an adaptor disposed in said annular space for transmitting drive force between said actuator and said valve.

4,977,783

LOAD MONITOR

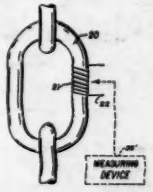
Hugh M. O. Pratt, Southampton, United Kingdom, assignor to Thomas J. Barnes, Sydney, Canada

Continuation of Ser. No. 201,561, Jun. 1, 1988, abandoned. This application Feb. 2, 1990, Ser. No. 474,653

Claims priority, application Canada, Jun. 1, 1987, 538463

Int. Cl.[5] G01L 5/10, 1/12

U.S. Cl. 73—862.39 1 Claim



1. A load cell for use in load measuring systems, comprising:

a load receiving chain having a plurality of links;

load sensing means located on one of said links, for directly sensing the strain on said link;

a measuring device remote from said sensing means for measuring the load on the link; and

at least one lead continuously interconnecting the sensing means to the remote measuring device while the sensing means is operated;

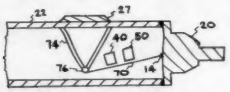
wherein the sensing means comprises a strain gauge located on one side of said one link.

4,977,784

AXLE SPINDLE LOAD AND TORQUE SENSING APPARATUS AND METHOD FOR SENSING LOAD AND TORQUE

Joseph S. Eckerle, Redwood City, Calif., assignor to SRI International, Menlo Park, Calif.

Filed May 8, 1989, Ser. No. 348,686
Int. Cl.[5] G01L 1/10; G01B 17/04
U.S. Cl. 73—862.54 23 Claims



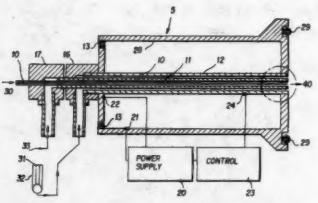
1. A vehicle load sensor apparatus for measuring the load on one or more spindles of a vehicle axle which comprises:
(a) an axle spindle;
(b) vibratable string means having one end attached to said axle spindle and an opposite end attached to said axle at a position spaced from said axle spindle; and
(c) means for determining the load on said spindle by measuring the change of tension in said vibratable string means comprising:
(1) means for inducing a vibration in said vibratable string means; and
(1) means for sensing the frequency of said vibration induced in said vibratable string means.

4,977,785

METHOD AND APPARATUS FOR INTRODUCTION OF FLUID STREAMS INTO MASS SPECTROMETERS AND OTHER GAS PHASE DETECTORS

Ross C. Willoughby, and James D. Buchner, both of Pittsburgh, Pa., assignors to Extrel Corporation, Pittsburgh, Pa.

Filed Feb. 19, 1988, Ser. No. 157,626
Int. Cl.[5] G01N 1/34
U.S. Cl. 73—863.12 12 Claims



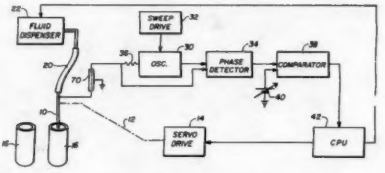
1. A decompression aerosol generating device for obtaining solvent depleted solute particles of micron or submicron size in a well defined direction from sample dissolved in a supercritical fluid or carried in a gas stream, the sample containing volatile solvent or carrier and less volatile solute, said device comprising:
a. a capillary tube to transport the supercritical fluid or gas into a decompression expansion chamber;
b. fluid supply means for supplying supercritical fluid or gas at a pressure adequate to maintain the fluid in a supercritical state and to flow in such state to said capillary tube;
c. thermal means for supplying or removing energy to heat or cool said capillary tube;
d. control means for controlling the quantity of heat supplied or removed from said capillary tube;
e. a decompression expansion chamber to receive fluid flow from said capillary tube which provides adequate space for high velocity gases and particles to reduce their velocity therein without substantial loss of the sample fluid due to particle impaction or settling;
f. a nozzle restriction at the downstream side of said decompression expansion chamber, whereby flow of said aerosol therefrom is accelerated through said nozzle restriction, forming a high velocity solute particle beam; and
g. a vacuum chamber downstream from the said nozzle restriction, whereby the aerosol flow emanating from the said nozzle restriction expands outwardly from the axis of said nozzle restriction, and vacuum pumping means maintaining a sufficiently low pressure in the said vacuum chamber to cause said outward expansion of said aerosol flow from said central axis;
whereby highly enriched solute particles are generated in said decompression expansion chamber and any carrier gases remaining in the vapor phase are separated from said highly enriched solute particles by accelerating the aerosol through said nozzle restriction.

4,977,786

CAPACITIVE LIQUID LEVEL SENSOR

James E. Davis, Wilmington, Del., assignor to E.I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 18, 1990, Ser. No. 466,937
Int. Cl.[5] G01N 35/06
U.S. Cl. 73—864.24 15 Claims



1. In a capacitive liquid level sensor for determine the liquid level of a sample in a liquid pipetting system, having:
a pipette probe for withdrawing liquid from a sample,
an oscillator coupled to the probe for applying a high frequency signal to the probe, the amplitude and/or phase of the signal being affected by the capacitance of the probe, and
comparator means for generating a level sensor signal according to the amplitude or phase of the high frequency signal for signaling the probe's reaching the liquid level of the sample, the improvement comprising:
sweep means for varying the frequency of the oscillator in a repetitive manner, at a predetermined sweep frequency whereby interference from external radio transmitter and interference to local radio receivers is reduced.

4,977,787

ELECTROMECHANICAL DEVICE FOR CHANGING THE POSITION OF HEAD MOUNTING PLATE IN A MAGNETIC TAPE APPARATUS

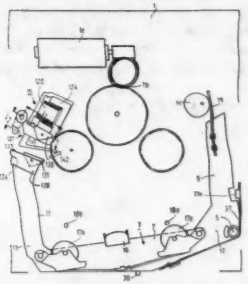
Karl Klös-Hein, Wettenberg, and Horst H. Rumpf, Herborn-Schönbach, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 2, 1988, Ser. No. 189,276
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1987, 3742736
Int. Cl.[5] G11B 21/12, 5/54; F16H 25/08, 25/16
U.S. Cl. 74—54 11 Claims

1. In an electrical apparatus comprising a functional element mounted for movement between a rest position and first and second operating positions, said first operating position being

spaced further from said rest position than said second operating position; return biasing means for biasing said functional element to said rest position from said first and second operating positions, means for moving said functional element from said rest position to said first operating position, and first electromagnetic holding means for electromagnetically holding said functional element in said first operating position, the improvement comprising:

control means for controlling the position of said functional element upon release of said functional element from said



first electromagnetic holding means and movement towards said rest position caused by said biasing means, said control means comprising means for exerting a holding force on said functional element smaller than said return bias for holding said functional element in said second operating position for a predetermined limited time, and second electromagnetic holding means for exerting an additional holding force on said functional element within said predetermined limited time for holding said functional element in said second operating position.

4,977,788

APPARATUS FOR ADJUSTING THE POSITIONS OF COMPONENTS IN MACHINES

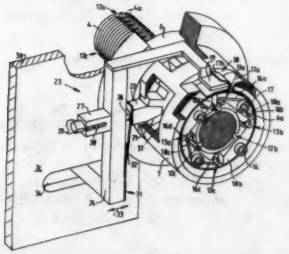
Alfred Besemann, Hamburg, Fed. Rep. of Germany, assignor to E.C.H. Will GmbH, Hamburg, Fed. Rep. of Germany

Filed Mar. 2, 1989, Ser. No. 317,728

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807730

Int. Cl.[5] F16H *25/24, 1/18;* F16D *11/06*

U.S. Cl. 74—424.8 R **17 Claims**



12. Apparatus for changing the position of at least one adjustable component, such as a tool or a tool holder in a machine tool, comprising a rotary feed screw having an axis of rotation; a motion receiving member for the adjustable component; a rotary nut mating with said feed screw and connected with said motion receiving member for movement therewith in the axial direction of said feed screw; engageable and disengageable coupling means for non-rotatably connecting said nut to said feed screw so that rotation of the feed screw does not entail a movement of the nut axially of the feed screw in engaged condition of said coupling means; engageable and disengageable arresting means for blocking rotation of said nut with said feed screw so that the nut and the motion receiving member move axially of the feed screw in response to rotation of the feed screw in engaged condition of said arresting means, said arresting means comprising an annulus of alternating teeth and tooth spaces and a bolt movable into and from selected tooth spaces, said coupling means comprising a plurality of axially parallel external grooves provided in said feed screw and a plurality of levers pivotably mounted on said nut and each having a first arm including a portion movable into and from said a groove of said feed screw and a second arm; means for simultaneously pivoting said levers to positions of disengagement from said feed screw including an elastic member surrounding said levers; and control means for engaging and disengaging said coupling means and said arresting means in a predetermined sequence, said control means including a mobile support for said bolt and means for tightening said elastic member around said levers so that the elastic member pivots the second arms of said levers in directions to expel said portions of the first arms from the grooves of said feed screw.

4,977,789

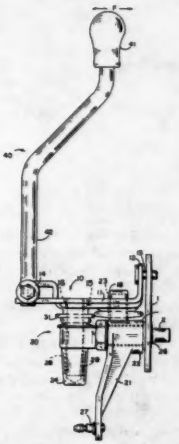
VEHICLE SHIFT LEVER ASSEMBLY

Charles Osborn, Spring Lake, Mich., assignor to Grand Haven Stamped Products Company, div. of JSJ Corporation, Grand Haven, Mich.

Filed Sep. 21, 1989, Ser. No. 410,343

Int. Cl.[5] G05G *9/18, 5/06*

U.S. Cl. 74—475 **18 Claims**



1. A shift lever assembly for an automotive vehicle transmission in which a shift lever and a lockout/mounting means is provided; means for mounting said assembly to the casing of a transmission mechanism for rotating said shift lever about a predetermined axis and for locking said shift lever in selected positions; said shift lever when mounted to the casing of said transmission extending from a position spaced horizontally from said lockout/mounting means to a level above said lockout/mounting means; an actuator arm extending downwardly from said lockout/mounting means and having at least its upper portion thereof spaced horizontally from the shift lever; connecting means extending between said lever, the said lockout/mounting means and the upper portion of said arm for operatively connecting said actuator arm to said shift lever whereby said shift lever can pivot said arm about a horizontal axis; means for shifting said shift lever and actuator arm to a plurality of different lockout positions; lockout means for

holding said shift lever and actuator arm in one of said lockout positions at any one time; release means operated by pushing downwardly on said shift lever for releasing said lockout means to permit said shift lever and actuator arm, while said shift lever is being depressed, to be shifted to different lockout positions; and an anti-rotation means for preventing the shift lever from turning or rotating about any axis other than said horizontal axis.

4,977,790

FLEXIBLE ARM

Yozo Nishi, and Hiroaki Takagi, both of Hiratsuka, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

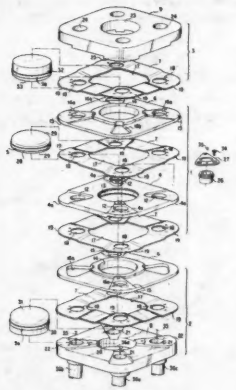
PCT No. PCT/JP88/00302, § 371 Date Oct. 24, 1989, § 102(e) Date Oct. 24, 1989, PCT Pub. No. WO88/07441, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 23, 1988, Ser. No. 415,279

Claims priority, application Japan, Mar. 23, 1987, 62-068652

Int. Cl.[5] B25J *18/06*

U.S. Cl. 74—479 2 Claims



1. In a flexible arm composed of a plurality of units disposed by being stacked in series and an actuating device connected thereto for curving the respective units, each of the units comprising:

(a) one disc having projectingly curved contact surfaces defined on both sides thereof;

(b) one support plate provided with a central hole defined coaxially with the axial center thereof to which said disc is fixed and a plurality of plate fitting surfaces alternately defined on both sides at the peripheral portion thereof with their phases shifted 90° about the axial center, each pair of the fitting surfaces being composed of those symmetrical with respect to the axial center;

(c) two torsion plates each provided with a hole defined at the center thereof for loosely accommodating said disc and a plurality of plate fitting surfaces alternately defined on both sides at the peripheral portion thereof with their phases shifted 90° about the axial center thereof, the fitting surfaces defined on the same surface of said torsion plate in an axial direction being fixed to each pair of the plate fitting surfaces on both sides of said support plate; and

(d) one intermediate plate provided with a central hole defined coaxially with the axial center thereof with which said disc is loosely engaged and plate fitting surfaces which are defined on both sides in the axial direction at the peripheral portion thereof and have their phases shifted 180° from one another so that they are symmetrical with respect to the axial center, said plate fitting surfaces being fixed to a pair of the fitting surfaces on a side, which is not fixed to the plate fitting surfaces of said support plate, of one of said two torsion plates, whereby the respective discs of said respective units are brought into contact each other and the torsion plate and the intermediate plate of each unit are connected by the respective fitting surfaces.

4,977,791

FLAP LEVER SYSTEM FOR ROTARY FLAPS

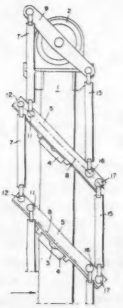
Volker Y. Erichsen, Recklinghausen, Fed. Rep. of Germany, assignor to Stober & Morlock, Warmekraft Gesellschaft mbH, Recklinghausen, Fed. Rep. of Germany

Filed Nov. 30, 1988, Ser. No. 277,807

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1987, 8715838[U]

Int. Cl.[5] F16K *1/18, 31/44*

U.S. Cl. 74—470 5 Claims



1. A flap linkage for several rotary flap shafts placed inside a frame comprising:

rotary flap shafts having straight double-armed levers with attachment means for attaching the levers to the rotary flap shafts at ends of the rotary flap shafts;

transmission elements are attached on arms of the double-armed lever, wherein the transmission elements are rigid pushrods with by an attachment means for attaching the levers to the rotary flap shafts;

wherein further swivel axes of the levers are parallel to a line that intersects rotational axes of the pushrods at the lever arms;

hubs being rigidly connected to the rotary flap shafts; and

springs which support the hubs against intermediate levers, wherein the intermediate levers are placed at the ends of the rotary flap shafts.

4,977,792

BRAKE CONTROL DEVICE FOR USE IN BICYCLE

Masashi Nagano, Osaka, Japan, assignor to Shimano Industrial Co., Ltd., Osaka, Japan

Filed Jul. 13, 1989, Ser. No. 379,313

Claims priority, application Japan, Jul. 15, 1988, 63-94302[U]

Int. Cl.[5] F16C *1/10;* G05G *11/00*

U.S. Cl. 74—502.2 6 Claims

1. A brake control device for use in a bicycle, comprising;

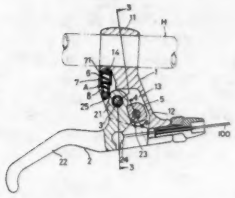
a bracket,

a brake lever pivotably supported to the bracket,

control force transmitting means operatively connected to the brake lever, said transmitting means being moved for braking the bicycle with a pivotal operation on said brake lever from a rest position to a working position thereof, and

an elastic support capsule incorporating and encapsulating

an elastic member and for elastically urging said brake lever towards said rest position, said elastic support capsule being disposed between said bracket and said brake lever.



4,977,793

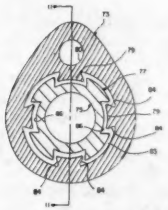
PLASTIC STABILIZED COMPOSITE CAMSHAFT

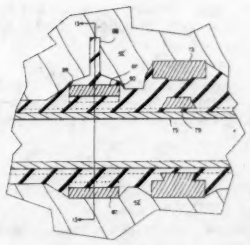
Royce H. Husted, 711 Lakeside Dr., Wheaton, Ill. 60187

Continuation-in-part of Ser. No. 208,382, Jun. 17, 1988, abandoned, which is a continuation-in-part of Ser. No. 103,843, Oct. 1, 1987, abandoned. This application Mar. 31, 1989, Ser. No. 331,492

Int. Cl.[5] F16H *53/00*

U.S. Cl. 74—567 **11 Claims**





1. A camshaft comprising:

an elongated shaft member having a first cross sectional configuration;

a plurality of cam elements positioned along the length of said shaft member in predetermined angular relationships thereto;

the interior of each of said cam elements having a second cross sectional configuration for nesting with said first configuration and defining a continuous space therebetween;

a flowable, hardenable material in said space for maintaining said cam element in said predetermined angular relationship on said shaft member;

said first and second configurations interlocking such that sections of said hardenable material in said space compressionally resist torsional loading between said cam element and said shaft member and said second configuration being such that shrinkage of said flowable, hardenable material increases its grip on said cam element.

4,977,794

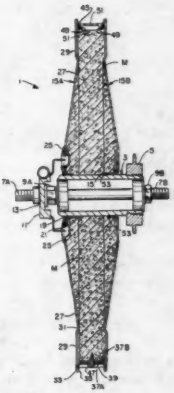
FLYWHEEL

Jeffrey D. Metcalf, Albion, Ill., assignor to Roadmaster Corporation, Olney, Ill.

Filed May 11, 1989, Ser. No. 350,216

Int. Cl.[5] G05G *1/00;* **F16F** *15/10*

U.S. Cl. 74—572 **7 Claims**



1. An exercise bicycle flywheel comprising a pair of facing, concave sheet metal discs, the space defined between said discs being filled with a material, each disc having a central opening for mounting the flywheel on a hub, the opening comprising a radial inner edge of each disc which is in a material-tight relation to said hub, an inwardly turned circumferential rim at the radial outer edge of the disc, the outer diameter of the rim of one disc being substantially equal to the inner diameter of the rim of the other disc for the first said rim to fit within the second said rim with the rims having a plurality of corresponding indentations equidistantly spaced therearound for the rims to interlockingly fit, a hole being formed in the corresponding indentation in each rim for the material to be poured into the space between the discs after they are fitted together, and a plug fitting in the holes after the material has been poured into the space.

7. An exercise bicycle flywheel comprising a pair of facing concave sheet metal discs, the space between the discs being filled with a fluent material consisting essentially, in parts by dry weight of:

Hematite chips: 69

Magnetite powder: 18

Hydrated lime: 3

Portland cement: 10

to which is added:

Water reduced: 10-25 oz. per 100 lb. cement

Water: as needed.

4,977,795

RELATING TO A RATCHET MACHANISM

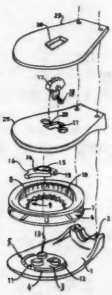
Carl McVey, Westcliff on Sea, United Kingdom, assignor to RWO (Marine Equipment) Limited, Essex, United Kingdom

Continuation of Ser. No. 246,938, Sep. 18, 1988, abandoned, which is a continuation of Ser. No. 919,717, Oct. 16, 1986, abandoned. This application Feb. 1, 1990, Ser. No. 474,641

Claims priority, application United Kingdom, Oct. 18, 1985, 8525706

Int. Cl.[5] G05G 1/00, 3/00

U.S. Cl. 74—575 7 Claims



1. A ratchet mechanism comprising an annular rotatable member incorporating an inner toothed periphery, means for mounting said rotatable member to allow free rotation thereof, a pawl incorporating means for engaging said toothed periphery, means for mounting said pawl adapted to permit said pawl to move from a disengaged position in which said pawl allows said rotatable member to rotate freely in either direction of rotation, to an engaged position in which said pawl prevents said rotatable member from rotating in one direction, and selectively operable means to move the pawl between the said positions, said selectively operable means incorporating a single over-dead-center spring arrangement which serves, when the pawl is in the disengaged position, to bias the pawl to said disengaged position and which serves, when the pawl is in the engaged position, to bias the pawl to said engaged position.

4,977,796

DRIVE SYSTEM FOR RAILROAD TRACK VEHICLE

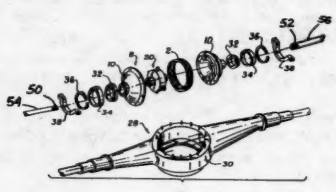
Mark E. Littke, Kamloops, Canada, assignor to Brentwood Enterprises, Ltd., Burnaby, Canada

Continuation of Ser. No. 627,807, Jul. 5, 1984, abandoned. This application Nov. 20, 1989, Ser. No. 438,975

Claims priority, application Canada, Jul. 5, 1983, 431820

Int. Cl.[5] F16H 37/06

U.S. Cl. 74—665 T 6 Claims



1. An axle adapter comprising:

a unitary body having opposite sides with two splined openings aligned along an axis, said sides being fixedly connected to each other, whereby rotation of one splined opening relative to the other splined opening is prevented; and a plurality of lugs extending radially outwards from said body.

4,977,797

METHOD OF SHIFT CONTROL IN AN AUTOMATIC TRANSMISSION

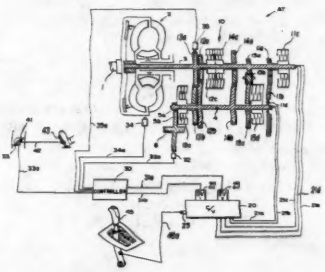
Takashi Aoki, Saitama; Satoshi Terayama, Tokyo, and Junichi Miyake, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 299,965

Claims priority, application Japan, Jan. 19, 1988, 63-009240

Int. Cl.[5] B60K 41/18

U.S. Cl. 74—866 7 Claims



1. A method of shift control in an automatic transmission having a torque converter and a shift-gear mechanism, wherein a shift map having at least one shift-up line and at least one shift-down line which are established corresponding to engine powers for driving said torque converter and to vehicle speeds is used to conduct said shift control, said shift-up line being established on a higher vehicle speed side than said shift-down line and a hysteresis zone being established between said shift-up line and said shift-down line, comprising the steps of:

shifting down to a lower speed range of said shift-gear mechanism when a point representing a traveling state on said shift map moves in a lower vehicle speed direction and crosses said shift-down line;

shifting up to a higher speed range when said point moves in a higher vehicle speed direction and crosses said shift-up line; and

shifting down to a lower speed range when said point is in said hysteresis zone after a shift of said speed range and also a speed ratio of said torque converter has been below a threshold level for more than a predetermined time.

4,977,798

TRANSMISSION RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

Masahiko Takahashi, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 290,036

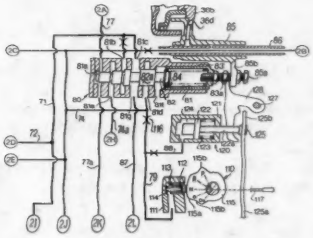
Claims priority, application Japan, Dec. 28, 1987, 62-332628

Int. Cl.[5] B60K 41/16

U.S. Cl. 74—867 6 Claims

1. In a control system for a continuously variable transmission for transmitting the power of an automotive engine to driving wheels of a vehicle, the transmission comprising a driving pulley having a hydraulically shiftable first disc and a first hydraulic cylinder for operating the disc, a driven pulley having a hydraulically shiftable second disc and a second hydraulic cylinder for operating the second disc, a belt engaged with both pulleys, the control system comprising a hydraulic circuit having a pump for supplying oil and a drain passage connected between a transmission ratio control valve and an oil reservoir for draining the oil, said transmission ratio

control valve having a plunger slidably mounted in a valve body, a spool slidably mounted in the valve body for controlling the oil to be supplied to the cylinder of the drive pulley and the oil to be drained from the cylinder of the drive pulley to the drain passage so as to change the transmission ratio of the transmission, and at least one spring between the plunger and the spool, a cam operatively connected with an accelerator pedal of the vehicle for shifting the plunger in accordance with depression of the accelerator pedal, shifting means for shifting the spool dependency on engine speed to compress the spring, thereby changing the transmission ratio of the transmission, actuating means responsive to the selection of a high engine speed driving range for shifting the plunger to increase load on the spring, and a correcting lever for controlling operation of



the actuating means in accordance with the transmission ratio in a larger transmission ratio range than a first predetermined transmission ratio, the improvement in said control system wherein

said correcting lever comprises:

means for controlling the operation of said actuating means for gradually changing the engine speed in accordance with the transmission ratio in a larger transmission ratio range than a second predetermined transmission ratio, and for rapidly changing the engine speed in accordance with the transmission ratio in a smaller transmission ratio range than the second predetermined transmission ratio; wherein

said second predetermined transmission ratio being larger than said first predetermined transmission ratio.

4,977,799

CLAMPING TOOL FOR STUD BOLT

Sueharu Yasutomi, 4-11, Uehonmachinishi 2-chome, Chuo-ku, Osaka, and Morimasa Taniguchi, 8-3, Oimazato 3-chome, Higashinari-ku, Osaka, both of Japan

Filed Sep. 27, 1989, Ser. No. 413,386

Claims priority, application Japan, Sep. 28, 1988, 63-245704

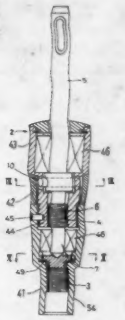
Int. Cl.[5] B25B 13/50

U.S. Cl. 81—53.2 **7 Claims**

1. A clamping tool for a stud bolt, comprising:

a tubular body having an axial bore therethrough, said axial bore having a wall surface having first female threads threadedly engaging a stud bolt and second female threads, said second female threads having a smaller mean diameter than said first female threads;

a drive shaft having a threaded shank on one end thereof for threadedly engaging said second female threads; and



a torque transmission means between said drive shaft and said tubular body for engaging said drive shaft with said tubular body when said drive shaft and said tubular body are turned relative to each other by a predetermined amount of angular rotation.

4,977,800

SCREWDRIVER BLADE CONSTRUCTION

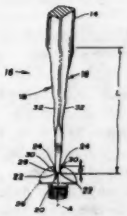
David S. Colvin, 23933 Haynes, Farmington Hills, Mich. 48024

Continuation of Ser. No. 292,481, Dec. 30, 1988, abandoned.

This application Mar. 21, 1990, Ser. No. 497,801

Int. Cl.[5] B25B 15/00

U.S. Cl. 81—436 **14 Claims**



1. A screwdriver having a central axis A, the screwdriver comprising:

a drive end for rotating the screwdriver about the central axis A; and

a shank that extends from the drive and along the central axis A; and

a blade projecting from the shank along the central axis A with a length L, the blade having oppositely facing blade surfaces that extend the entire length of the blade and the blade also having a tip that cooperates with the oppositely facing blade surfaces to define a pair of spaced terminal edges providing a width dimension W, the length L being in the range of 3 to 9 W and the blade surfaces converging over the entire extents thereof toward the tip along the entire distance of length L, each blade surface having an engagement location spaced from the adjacent terminal edge by a depth dimension D that is in the range of 0.2 to 0.5 W, a plane through the engagement location of each blade surface and the adjacent terminal edge defining an angle B with the central axis A in the range of 0.5 to 3.3°,

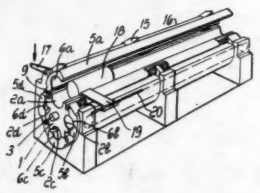
and the blade also having side surfaces that connect the oppositely facing blade surfaces and converge their entire extends toward the tip.

4,977,801

MULTIPLE-CHANNEL GUIDING DEVICE FOR BAR-LOADERS OF AUTOMATIC MACHINE TOOLS

Vladimiro Fabbri, Faenza, Italy, assignor to I.E.M.C.A. SpA Industria Elettromeccanica Complessi Automatici, Faenza, Italy

Filed May 30, 1989, Ser. No. 358,905
Claims priority, application Italy, Jun. 3, 1988, 3492 A/88
Int. Cl.[5] B65H *5/16*
U.S. Cl. 82—127 **12 Claims**



1. A multiple-channel guiding device for bar loaders of automatic machine tools comprising:

an elongated body having a longitudinal axis and a plurality of grooves being peripherally defined thereon, each groove of said plurality of grooves having a substantially semicircular profile, said elongated body being rotatable about said longitudinal axis so as to selectively move said grooves to a loading position,

a plurality of covers cooperating with said grooves and being positionable between an opened position and a closure position, a plurality of substantially circular bar guiding channels being defined by said cooperating covers and grooves when said covers are in said closure position, said plurality of channels having mutually different diameters and having centers arranged on a circle which is concentric to said axis,

means for inserting bars in said grooves, said covers being positioned in said opened position when said grooves are in said loading position to thereby receive bars,

a bar-pusher element being slidably actuated inside said channels to advance bars therein,

a cylindrical drum assembly being defined by said body and said covers when said covers are in said closure position, said covers having outer surfaces being cambered so that said cylindrical drum defines an outer surface having a substantially circular profile being concentric to said axis, said device further comprising at least one substantially upwardly open support means for rotatingly supporting said cylindrical drum, said support means defining at least one substantially circular cavity and an opening, said cylindrical drum being rotatably accommodated in said circular cavity of said support means, said upwardly opening support means allowing said covers to be positioned in said opened position at said opening thereof.

4,977,802

SELF ALIGNING GUIDES FOR CIRCULAR SAWS

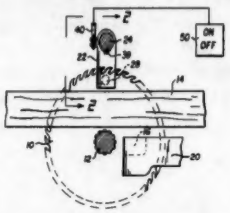
Eberhard Kirbach, 10260 Dennis Crescent, Richmond, British Columbia, Canada V7A 3R8

Filed Aug. 9, 1989, Ser. No. 391,084
Int. Cl.[5] B27B *5/34, 11/02*
U.S. Cl. 83—13 **10 Claims**

1. A circular sawing system including at least one saw blade mounted on a shaft, with a positionable saw blade guide located on one portion of the saw blade, and a floating saw blade guide means located on another portion of the saw blade, the floating saw blade guide means comprising:

a first guide block having a face engageable with one side face of the saw blade and a second guide block with a face engageable with the other side face of the saw blade,

a guide housing containing the first and second guide blocks, the guide housing slidingly mounted on an elongate member substantially parallel to the saw blade shaft,



clamp means for unclamping the guide housing from the elongate member thereby permitting the saw blade to move the guide housing and for clamping the guide housing on the elongate member after initial rotation of the saw blade, and

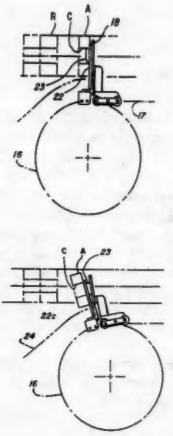
operational means to affect the clamping and unclamping of the guide block on the elongate member.

4,977,803

SAW MECHANISM FOR LOGS CONVOLUTELY WOUND ON CORES AND METHOD

Lawrence E. Blom, Coleman, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed Jun. 27, 1989, Ser. No. 372,308
Int. Cl.[5] B26D *3/16*; B65G *17/46*
U.S. Cl. 83—23 **9 Claims**



1. A saw mechanism for logs convolutely wound on cores having upstream and downstream ends comprising: a frame, conveyor means for longitudinally advancing a series of logs along a horizontal path in said frame, blade means rotatably mounted on said frame, means on said frame for moving said blade means to intersect said path to transversely sever said log into retail-size rolls, a trough on said frame defining said path, an elongated slot in said trough, a sprocket-equipped endless

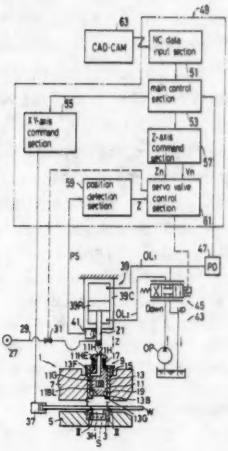
chain on said frame below said trough, said chain having a plurality of links and with spaced apart individual links being equipped with carriage means, a pusher mounted on each carriage means for engaging the upstream ends of said logs for advancing the same, each pusher being equipped with a horizontally extending support member adapted to enter the upstream end of said core to support said log against cutting incident to severing the last roll from said log, and a stripper for each pusher mounted on a link of said chain downstream of its associated pusher whereby when said chain passes around a sprocket, said stripper is adapted to remove a trim annulus from said support member.

7. A method of sawing logs convolutely wound on cores comprising advancing said logs along a horizontal path past saw means, moving said saw means across said path to transversely sever each log into retail-size rolls, supporting the upstream end of each log while the same is being advanced in said path by inserting a support member into the log core and, after the last severing of a log to provide a trim annulus, arcuately advancing the trim annulus off of said support member.

4,977,804
PUNCH PRESS

Kinshiro Naito, Isehara, Japan, assignor to Amada Company, Limited, Japan

Filed Feb. 3, 1989, Ser. No. 305,758
Claims priority, application Japan, Feb. 5, 1988, 63-13627[U]; Feb. 5, 1988, 63-13628[U]
Int. Cl.[5] B21B *28/34, 45/04*
U.S. Cl. 83—76.7 **8 Claims**

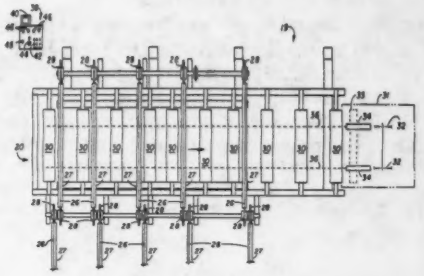


1. A punch press comprising:
a frame,
a die holder mounted on the frame,
a die having a diehole and mounted on the die holder;
a punch set having a punch guide, a punch holder and a punch wherein the punch guide is mounted in the punch holder in a vertically movable manner and the punch is mounted in the punch guide in a vertically movable manner, for performing a punching process on a workpiece in cooperation with the die,
the punch set being formed with a fluid discharge orifice means for discharging a fluid into the diehole and,
the punch being formed with a communication orifice communicating with the fluid discharge orifice, wherein the communication orifice communicates with an interstice between the punch guide and the punch holder;
a ram for striking the punch, formed with a fluid supply orifice for freely communicating with the communicating orifice; and
a connecting pipe means for connecting the fluid supply orifice with a fluid source.

4,977,805
EDGING APPARATUS

Andrew J. Corley, III, Lookout Mountain, Tenn., assignor to Corley Manufacturing Company, Chattanooga, Tenn.

Continuation-in-part of Ser. No. 850,225, Apr. 10, 1986. This application Jun. 16, 1987, Ser. No. 65,170
Int. Cl.[5] B26D *5/04*
U.S. Cl. 83—76.8 **5 Claims**

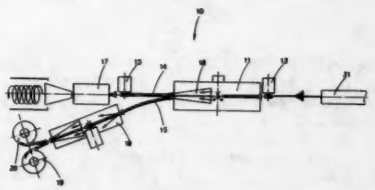


1. An edging apparatus controlled by an operator and having saws for edging a board that is priced by the whole board foot in accordance with a rounding rule, comprising:
positioning apparatus for positioning and holding the saws;
selection means controlled by the operator for selecting initial cut positions for the saws;
input means for generating input data including board length and initial cut positions;
compute means responsive to the input data for at least multiplying the length data by a width factor corresponding to the initial cut positions to produce a computed signal;
output means for outputting the computed signal; and
means for positioning the saws based on the computed signal.

4,977,806
PLANT TO CROP HEAD AND TAIL AND TO TAKE SAMPLES

Alfredo Poloni, Ronchi Dei Legionari, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Continuation of Ser. No. 210,988, Jun. 24, 1988, abandoned. This application Nov. 13, 1989, Ser. No. 434,999
Claims priority, application Italy, Jul. 13, 1987, 83404 A/87
Int. Cl.[5] B23D *25/12*
U.S. Cl. 83—105 **5 Claims**



1. Plant for cropping and sampling a rolled product, and for processing the rolled product at high or very high speeds, comprising: at least one first flying shears for shearing the head and tail from rolled product passing through and for correctly delivering the sheared head and tail; a discharge conduit receiving the sheared head and tail delivered from said first flying shears; a second flying shears downstream of said discharge conduit for shearing the terminal portion of the sheared head or the initial portion of the sheared tail to form sample portions of the sheared terminal or initial portion and remain-

ing portions of the sheared head or tail, and for separately discharging said sample portions and said remaining portions; and at least one sample-portions container for collecting only the sample portions separately discharged from the second flying shears.

4,977,807

SLIT IMPARTING DEVICE FOR FORMING THROUGH CUTS IN A PLASTIC FILM

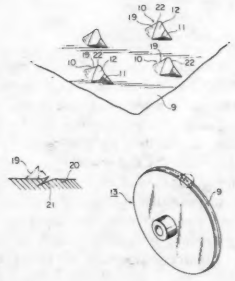
Hisao Kai, Chiba, and Kiyoshi Nakashima, Ageo, both of Japan, assignors to Asahi Chemical Polyflex Ltd., Tokyo, Japan

Division of Ser. No. 256,220, Oct. 12, 1988, Pat. No. 4,919,272, which is a continuation of Ser. No. 803,446, Dec. 2, 1985, abandoned. This application Oct. 6, 1989, Ser. No. 418,431

Claims priority, application Japan, Dec. 3, 1984, 59-254207; Dec. 14, 1984, 59-262951; Aug. 20, 1985, 60-180930

Int. Cl.[5] B26D *3/12*

U.S. Cl. 83—676 **4 Claims**



1. A slit imparting device comprising a disc having a circumferential surface and pseudotriangular slender cutting edges consisting of cut protrusions raised from said circumferential surface and aligned linearly in a plurality of straight rows extending around the entire circumferential surface of said disc, each cut protrusion of said cut protrusions extending outwardly from said circumferential surface at an angle at said cut protrusion of at least 60° and no greater than 100° to said circumferential surface and a raised angular portion immediately behind and extending from said raised cut protrusion and having outer sloping side surfaces tapering downwardly, outwardly and rearwardly into said circumferential surface of said disc.

4,977,808

STRINGED MUSICAL INSTRUMENT WITH A SOLID BODY MADE OF CLAY BASED MATERIAL

Robin Thacker, 1604 Poplar Rd., Mascouche Heights, Quebec, Canada J7L 2J3

Filed Feb. 27, 1989, Ser. No. 315,563

Int. Cl.[5] G10D *3/00*

U.S. Cl. 84—291 **6 Claims**

1. A stringed musical instrument comprising:

a solid resonating body made of dense and homogeneous ceramic material obtained from a clay-based fluid slip;

an elongated neck assembly mounted to said body;

strings mounted to said neck assembly and extending therealong; and

pick-up means mounted to said solid body for sensing oscillation of said strings and for generating an output signal upon oscillation of at least one of said strings.

4,977,809

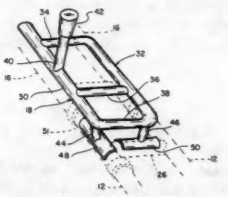
TROMBONES AND THE LIKE

Glenn L. Staley, Jr., 1508 E. Walnut, Carbondale, Ill. 62901

Filed Dec. 4, 1989, Ser. No. 444,964

Int. Cl.[5] G01D *7/10*

U.S. Cl. 84—395 **11 Claims**



1. A bracket assembly for mounting on a trombone to provide an alternative gripping position for the supporting hand of a player, comprising a framework of connected members including a pair of spaced side frame members and at least two spaced braces connected therebetween, an angularly oriented mounting portion connected to each of the side frame members, each mounting portion having a free end, an attachment member on the free end of each mounting portion, the attachment member on one mounting portion being angularly related to the attachment member on the other mounting portion and located so that the attachment members can be positioned in engagement with angularly related tubular portions on the trombone, means for attaching the attachment members to the trombone, and a transversely extending member attached to one of the side frame members in position so that when the hand that supports the instrument engages said bracket assembly and the thumb thereof engages the transversely extending member one or more fingers on the supporting hand will be in position to engage one of the two spaced braces.

4,977,810

MEANS FOR REGULATING CYMBAL PEDAL TAUTNESS

Wu H. Hsieh, No. 178, Chung Shan Erh Rd., Lu Chou Hsiang, Taipei Hsien, Taiwan

Filed Mar. 28, 1990, Ser. No. 500,757

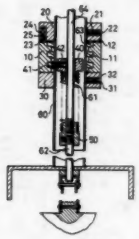
Int. Cl.[5] G10D *13/00*

U.S. Cl. 84—422.3 **3 Claims**

1. A means for regulating cymbal pedal tautness comprising a pedal connected by a pedal chain to a lower draw bar, said lower draw bar connected at an upper end thereof to a coupling block, a spring being connected at one end to said coupling block and at another end to an end block, an upper draw bar being connected at a lower end thereof to said coupling block, said upper draw bar extending up through said end block and connecting at an upper end thereof to a top cymbal, a depression of said pedal causing the top cymbal to rapidly descend crashing down on a lower cymbal to produce a percussional effect, the improvement wherein;

a tube within which said upper and lower draw bar are disposed is formed with two diametrically opposed slots in the region of said end block, two set screws which fix into said end block each protruding through a said slot, each

said set screw resting within a screw acceptor formed on an inner surface thereof with screw threading, a twist of said screw acceptor causing said spring to either loosen or tighten thus regulating the pedal tautness, said screw acceptor further being formed on an upper surface thereof



with V-shaped teeth, a pair of ball bearings being disposed within said V-shaped teeth, said ball bearing each fitting in a respective spring loaded recess formed in one of an upper fixed ring disposed above said screw acceptor or a lower fixed ring being disposed below said screw acceptor.

4,977,811

ANGLE SENSOR FOR MUSICAL TONE CONTROL

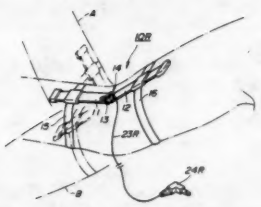
Hideo Suzuki; Shunichi Matsushima; Masahiko Obata; Takamichi Masubuchi, and Masao Sakama, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed May 16, 1989, Ser. No. 352,410

Claims priority, application Japan, May 18, 1988, 63-65706

Int. Cl.[5] G10H *1/32*; G01B *7/30*; A61B *5/103*; H01C *10/32*

U.S. Cl. 84—600 **4 Claims**



1. An angle sensor for musical tone control comprising:

a pair of plate members coupled pivotally and movably around an axis which is parallel to both faces of said plate members;

detecting means for detecting a signal in response to an angle when said pair of plate members pivot in relation to each other around said axis, said detecting means generating a musical tone control signal in response to said signal to control a musical tone;

attaching member for arranging said pair of plate members on the interior side of the bending articulation so that said pair of plate members pivot in relation to each other around said axis in response to the bending motion of articulation.

4,977,812

ACCOMPANIMENT LINE PRINCIPAL TONE DETERMINATION SYSTEM

Mayumi Ino, Akishima, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

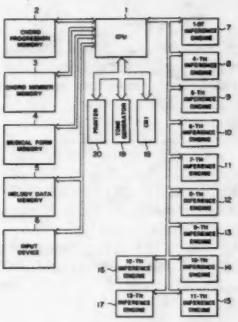
Division of Ser. No. 224,120, Jul. 25, 1988, Pat. No. 4,896,576. This application Sep. 27, 1989, Ser. No. 413,546

Claims priority, application Japan, Jul. 30, 1987, 62-188913; Jul. 30, 1987, 62-188914; Jul. 30, 1987, 62-188915; Jul. 30, 1987, 62-188916; Jul. 30, 1987, 62-188917; Jul. 30, 1987, 62-188918

The portion of the term of this patent subsequent to Jan. 30, 2007, has been disclaimed.

Int. Cl.[5] G10H *1/36*

U.S. Cl. 84—634 **5 Claims**



1. A system for determining a principal tone for each of a plurality of segments of an accompaniment line, in an environment wherein data of music are provided before said principal tone is determined, comprising:

hierarchic structure means for defining, as at least part of said data of music, a hierarchic structure of segments of music; and

principal tone inference means for generating an output signal based on inferring a principal tone for a segment of interest among said segments of music, in accordance with said hierarchic structure defined by said hierarchic structure means, whereby a principal tone is determined by said principal tone inference means for each of said plurality of segments of the accompaniment line.

4,977,813

ELECTRONIC MUSICAL INSTRUMENT HAVING PLAYING AND PARAMETER ADJUSTMENT MODE

Takashi Norimatsu, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Division of Ser. No. 184,602, Apr. 21, 1988, Pat. No. 4,873,904. This application Aug. 24, 1989, Ser. No. 397,908

Claims priority, application Japan, Apr. 22, 1987, 62-100772; Apr. 22, 1987, 62-100773; Apr. 22, 1987, 62-100774

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] G10H *3/18*

U.S. Cl. 84—722 **1 Claim**

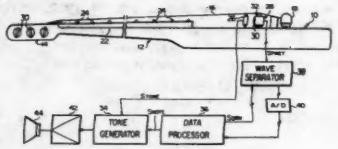
1. An electronic musical instrument having a parameter adjustment mode and a playing mode of operation, comprising

(a) a plurality of fret members located at predetermined spacings;

(b) a string stretched over said fret members so that a player's depression of the string causes contact between the string and at least one of said fret members,

(c) vibration generating and receiving means for producing supersonic vibrations having a variable waveform in said string and receiving the supersonic vibrations reflected from any of said fret members through said string, the

supersonic vibrations transmitted from said vibration generating and receiving means being reflected from a fret member contacted by said string, so that said vibration generating and receiving means detect transmitting characteristics of said string when a parameter adjustment mode is selected;



(d) data forming means for forming data representing said transmitting characteristics of said string; and

(e) fret position detecting means responsive to said data supplied by said data forming means for detecting said fret member contacted by said string when a playing mode of operation is selected.

4,977,814

AUTOMATIC SAFETY DEVICE FOR FIRE ARMS

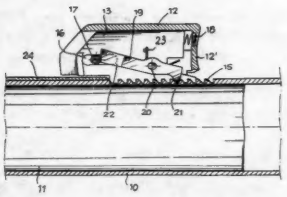
Pier G. Beretta, Gardone V.T., Italy, assignor to Fabbrica D'Armi P. Beretta S.P.A., Italy

Filed Jan. 10, 1990, Ser. No. 462,812

Claims priority, application Italy, Jan. 11, 1989, 5101 A/89

Int. Cl.[5] F41A 3/72, 7/02, 17/42, 17/76

U.S. Cl. 89—1.4 5 Claims



1. Automatic safety device for fire arms, like automatic guns, to be operated starting with their bolt is in open position both for automatic shooting and single shots, said bolt (11) being manually displaceable by means of a slider (12) in a breech (10) starting from an advanced closed position against the barrel and ending in an open rear position defined by a tripping mechanism, characterized in that to the bolt (11) a support (13) is fixed and extending into a longitudinal slot (14) cut into breech (10), in that at least at one side of said slot (14) the breech is fitted with a toothing (15) made of a sequence of teeth transversely oriented with respect to the direction in which said bolt is displaced, in that said slider (12) is assembled to said support (13) and able to slide between an advanced position where it is axially disengaged from the support and a rear position where it is axially engaging said support in order to take the bolt (11) to its rear, open position, and in that on said support (13) a rocking catch lever (19) is assembled, one end of said lever (19) being fitted with a catch tooth (21) designed to interact with said toothing (15), while its opposite tail end (22) is designed to interact with a pin (17) fixed and displaceable with slider (12) on support (13), in that the slider (12) and the rocking lever (19) cooperate in order to allow said tooth (21) of lever (19) to engage in said toothing (15) so as to prevent the bolt (11) from advancing in case of a faulty move or release during its motion towards its rear open position, and to maintain said lever (19) in an inactive position as long as the arm is used for automatic shooting or single shots, said lever being inactivated when the bolt is in its rear position on the tripping mechanism and its catch tooth (21) is not engaged in said toothing (15).

4,977,815

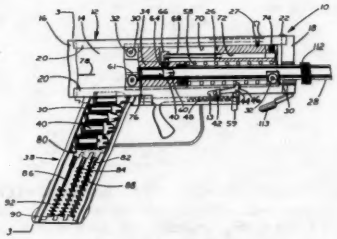
SELF CLEANING AUTOMATIC MACHINE PISTOL AND SILENCER FOR THE SAME

Mark L. Stephens, 9478 Valley View, Alta Loma, Calif. 91701

Filed May 5, 1989, Ser. No. 347,766

Int. Cl.[5] F41A 5/24

U.S. Cl. 89—180 13 Claims



1. An automatic machine pistol comprising:

a body including a barrel and barrel block;

a bolt reciprocating within said body and with respect to said barrel and barrel block;

a bleed port defined through said barrel block to continuously allow a predetermined degree of gaseous communication from said barrel through said bleed port;

a gas port tube fixed with respect to said body and in gaseous communication with said bleed port for receiving gas from said barrel and directing said gas forwardly within said pistol;

a receiving bore defined in said bolt for telescopically receiving said gas port tube therein, one end of said gas port tube continuously positioned within said bore as said bolt reciprocates with respect to said body and gas port tube which is fixed with respect to said body; and

an exhaust port communicating with said receiving bore to continuously allow escape of gas from said receiving bore to define a predetermined degree of flow resistance to gas flowing from said barrel through said bleed port and gas port tube into said receiving bore to resistively cushion recoil allowing a predetermined degree of recoil, so that a portion of high pressure gas is bled from said barrel through said bleed port and into said gas port tube and into said receiving bore within said bolt to resist recoil of said bolt upon firing of said pistol.

4,977,816

HYDRAULIC MOTOR CONTROL SYSTEM WITH ROTATING SERVO-VALVE

Werner Kuttruf, Wuppertal, Fed. Rep. of Germany, assignor to BW Hydraulik GmbH, Wuppertal, Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 502,577

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1989, 3912743

Int. Cl.[5] F15B 9/09, 9/10

U.S. Cl. 91—375 R 7 Claims

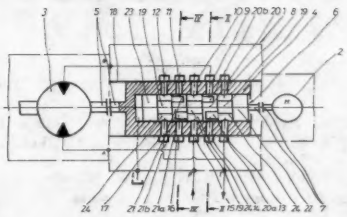
1. In a hydraulic control mechanism for an operating element, such as a hydraulic motor, hydraulic cylinder, or the like, with said control mechanism employing presetting of a set point, for example via a stepping motor, and mechanical feedback of an actual value, whereby valve means regulate the direction and quantity of a pressure medium stream that is supplied to said operating element from a source of pressure medium and that flows back from said operating element to the

pressure medium tank, the improvement wherein said control mechanism comprises:

a housing having a bore;

a hollow piston that is rotatably mounted in said bore in such a way that it cannot shift axially, with said hollow piston being divided into five axially successive planes, in each of which is disposed at least one through-bore that extends transverse to an axis of said hollow piston, whereby said through-bore in each plane opens into a respective circumferential groove in the bore wall of said housing, with lines from said pressure medium source and tank, and lines of said operating element, being connected to said circumferential grooves;

a central piston that is rotatably mounted in said hollow piston in such a way that it cannot shift axially, with said central piston comprising four individual pistons that are spaced from one another and are rigidly interconnected



via rod sections, with the two central ones of said individual pistons being control pistons and being centrally disposed relative to the second and fourth ones respectively of said hollow piston planes, whereas each of the other two individual pistons at the ends being spaced from an adjacent control piston by such a distance that an opening of a respective one of said through-bores disposed therebetween is exposed, whereby each of said control pistons, on a cylindrical outer surface thereof, is provided with at least two axially extending recesses that start from opposite end faces of that control piston and end before the other end face thereof, with said recesses being disposed in such a way that in a middle position of said control mechanism, facing axial control edges of said recesses touch the pertaining through-bore of said hollow piston; and

means to individually positively connect said hollow piston and said central piston with set point presetting means and actual value feedback means.

4,977,817

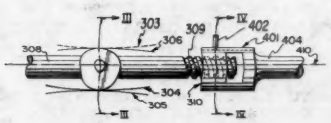
MOTION MODIFIER METHOD AND APPARATUS

David G. Doman, 927 Bayview Drive, Delta, British Columbia, Canada V4M 2R5

Filed Nov. 7, 1988, Ser. No. 268,708

Int. Cl.[5] F01B 9/00; F16H 25/20

U.S. Cl. 92—31 6 Claims



1. Displacement pump apparatus comprising a first reciprocating member, a second reciprocating member connected to said first reciprocating member, relative displacement means mounted between said first and second members, one of said first or second members being movable relative to said displacement means and the other of said first or second members to substantially eliminate flow fluctuations, said first or second member being movable by a profiled surface and follower means, said relative displacement means being screw means between said first and second members.

4,977,818

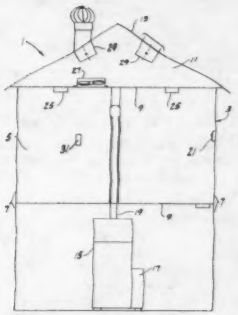
AIR FLOW CONTROL SYSTEM

Harry L. Taylor, and Charles O. Ehret, both of 54 Buckley Meadows Dr., St. Louis, Mo. 63125

Continuation-in-part of Ser. No. 222,956, Jul. 22, 1988, Pat. No. 4,928,583. This application May 26, 1989, Ser. No. 357,205

Int. Cl.[5] F24F 11/00

U.S. Cl. 98—31.6 14 Claims



6. In combination with a building having a roof, a plurality of walls and rooms, one of the rooms having a blower for circulating the air in the building, and a plurality of vents in the rooms and the roof, the vents movable between a resettable open position and a closed position, an air flow control system for controlling the air flow within the building comprising:

means for detecting fire, smoke, gas, or high heat in the building;

means for indicating detection of fire, smoke, gas, or high heat in the building connected to the detecting means;

means for closing the vents upon the detection of fire, smoke, gas, or high heat in the building connected to the detecting means;

means for resetting the vents upon the detecting means determining that fire, smoke, or high heat is no longer in the building; and

means for disabling the resetting means to prevent the vents from opening until the detecting means determines that fire, smoke, gas, or high heat is no longer in the building.

4,977,819

MACHINE FOR BREWING HOT BEVERAGES

Horst Lorenz, Solingen, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany

Filed Apr. 28, 1988, Ser. No. 187,374

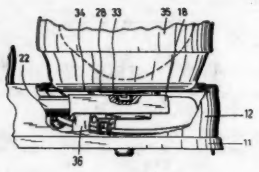
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, 8706245

Int. Cl.[5] A47J 31/00

U.S. Cl. 99—279 15 Claims

1. Machine for brewing hot beverages, comprising a housing; a container for storage of a supply of liquid in said housing; a heating unit for liquid in said housing; a supporting unit for beverage-receiving vessels adjacent said heating unit, one of said units being movable toward and away from the other of said units; and a distancing element removably installed between said units and arranged to maintain said units at a selected minimum distance from each other irrespective of the

temperature of said heating unit and to permit said one unit to move to a position at a different second distance from said other unit upon removal of said distancing element between said units.

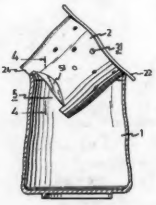


4,977,820

BREWER FOR TEA OR COFFEE

Lung K. Lin, 2 Fl., No. 88, Cheng Fu Rd., Taipei, Taiwan

Filed Feb. 21, 1990, Ser. No. 482,547
Int. Cl.[5] A47J 31/18
U.S. Cl. 099—323 2 Claims



1. A brewer comprising a container being substantially a cup having an open upper end; and a retainer being substantially a cup of reduced size, an outward flange being formed on an upper end of said retainer, said retainer being removably supported in an upper portion of said container by said outward flange, an annular flange being formed on a lower end of said retainer, two notches being formed in said annular flange, a plurality of holes being formed in a peripheral surface and a bottom of said retainer; and said notches of said retainer being engagable with one side of said open upper end of said container and said outward flange of said retainer being engagable with an other side of said open upper end of said container so that said retainer is inclinably supported on top of said container.

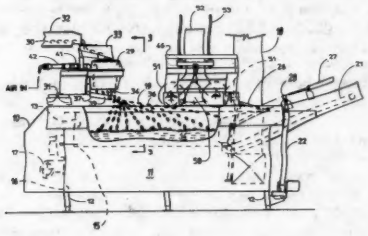
4,977,821

AUTOMATIC STIRRING OF BATCH FRIED FOOD PRODUCTS

Clark K. Benson, Millbrae, and Andrew A. Caridis, Foster City, both of Calif., assignors to Heat and Control, Inc., South San Francisco, Calif.

Filed Jan. 13, 1989, Ser. No. 297,415
Int. Cl.[5] A47J 37/12
U.S. Cl. 99—348 4 Claims

1. A batch cooker for preparing potato chip including means serving as a vat for containing a supply of cooking oil, means for heating the oil in the vat, potato slicer means arranged so that its discharge is disposed above the vat, air propelled slice dispensing means disposed below said slicer means and serving to disperse in a blast of air a batch of uncooked potato slices upon the surface of the cooking oil, means for dunking and stirring the slices while in the cooking oil, and means serving to remove the slices from the oil upon completion of the cooking cycle.

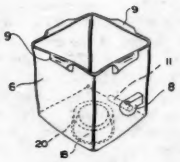


4,977,822

KNEADING MEANS OF A HOME AUTOMATIC BREAD BAKING DEVICE

Soon K. Seo, Seoul, and Hae S. Cho, Suweon, both of Rep. of Korea, assignors to SamSung Electronics Co., Ltd., Kyung, Rep. of Korea

Filed May 8, 1989, Ser. No. 348,841
Claims priority, application Rep. of Korea, May 9, 1988, 6971/88; Jun. 24, 1988, 9820/88
Int. Cl.[5] A23L 3/00; A47J 27/00
U.S. Cl. 99—348 22 Claims



1. A home automatic bread baking device including a separate air blowing chamber and a heating chamber, with the heating chamber having a kneading container, comprising;

a receiving portion for storing a kneading member in a predetermined position in said kneading container;

a first projecting member mounted in the lower portion of said heating chamber;

at least one elastic support member fixed around the circumference of and adjacent to the upper portion of said heating chamber;

a second projecting member formed integrally on the bottom of said kneading container to engage said first projecting member; and

a circularly extending member having a width extending from each side of the upper portion of said kneading container to engage said elastic support member.

4,977,823

CIRCULATIVE CATERING TABLE PROVIDED WITH COOL AIR CIRCULATING SYSTEM

Kiyohiro Kuwahara, Kanazawa, Japan, assignor to Nihon Kuresento Kabushiki Kaisha, Matto, Japan

Filed Aug. 1, 1989, Ser. No. 387,968
Claims priority, application Japan, Aug. 2, 1988, 63-102528
Int. Cl.[5] A47J 37/00, 37/06
U.S. Cl. 99—355 3 Claims

1. A circulative catering table comprising:

an endless conveyer circulating according to the circulating

course supported in a horizontal plane at a designated height by a base frame and supporting foods at designated intervals,

an appropriate number of counters, for eating and drinking disposed outside of the endless conveyer,

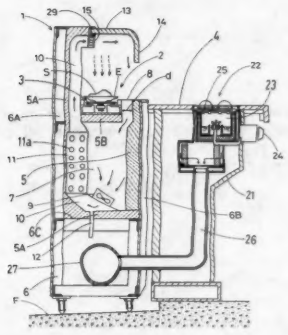
smokeless roasters disposed at appropriate places along the counters, and

a cool air circulating system for cooling the foods on the endless conveyer,

said cool air circulating system including;

a first cool air path forming a lower opening provided between the outside of the endless conveyer and the counter and extending downwards of the base frame in communication with the lower opening,

a second cool air path disposed in opposition to the lower



opening against the endless conveyer, with a lower part thereof in communication with the first cool air path and with the an opening at an upper end, that blows out the cool air in a direction crossing above the endless conveyer and toward a space above the lower opening,

both of the first and the second cool air paths being covered with heat insulators,

a blowing means which sends the air of the first cool air path to the second cool air path,

a cooling means which cools the air of the second cool air path and

a cool wind guide, one end of which is secured to an upper part of the upper opening of the second cool air path and the other end of which extends over the lower opening and forms a guide portion having a gap for taking out the foods placed on the endless conveyer.

4,977,824

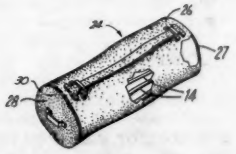
ROLL-UP CAMPFIRE COOKING GRILL ASSEMBLY

LeRoy J. Shinler, Rte. 1, Box 220, Rush City, Minn. 55069

Filed May 7, 1990, Ser. No. 519,633

Int. Cl.[5] A47J 33/00, 37/07

U.S. Cl. 99—449 18 Claims



1. A roll-up cooking grill presenting, when in open condition for use, a relatively flat, substantially rectangular, longitudinally extending, upwardly facing cooking table; and when in rolled up condition for cleaning or storage, configured to be circumscribed within a generally cylindrical surface, said grill including:

a. a plurality of mutually parallel, spaced-apart transversely extending rods;

b. two sets of side plates, each set including a multiplicity of longitudinally extending side plates, each side plate having:

(1) a leading end portion permanently mounted with respect to an outer end of a first of said rods,

(2) an intermediate portion permanently mounted with respect to an immediately adjacent second rod in trailing direction, and

(3) a trailing end portion extending into interfering relation above a third rod immediately adjacent the second rod in trailing direction;

c. wherein each end of each rod is permanently mounted to two adjacent side plates;

d. wherein at least one of the first and second rods is rotatably mounted with respect to each side plate; and

e. wherein the upper edge surfaces of the rods define a relatively flat surface of a cooking table when the cooking grill is in open condition with the trailing end portion of each side plate supported on the upper edge of its third trailing rod.

4,977,825

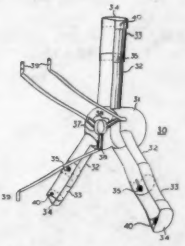
DIFFUSING BAFFLE APPLYING SPROUT INHIBITOR TO STORED POTATOES

Charles R. Morgan, 4659 Enterprise St., Boise, Id. 83705

Filed Dec. 28, 1989, Ser. No. 447,612

Int. Cl.[5] A23B 7/00

U.S. Cl. 99—476 7 Claims



1. A diffusing baffle for use in applying sprout inhibiting chemicals to potatoes stored in a potato storage facility having an air supply plenum, a fan for discharging air into the air supply plenum, and a plurality of ventilation pipes open to the air supply plenum for delivering air to the stored potatoes, which comprises:

a central plenum receiving baffle;

means for introducing a sprout inhibiting chemical into said central plenum receiving baffle;

a plurality of elongated channel shaped radial arms attached to and extending radially out from said central plenum receiving baffle so as to form radially extending channels for the transport of sprout inhibiting chemical from the introduction means to the ends of said arms; and

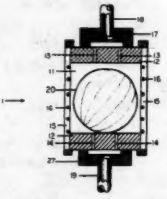
means for centrally positioning the central plenum receiving baffle in front of the discharge of the fan.

4,977,826

FLUID IMPINGEMENT METHOD AND APPARATUS FOR FRUIT MEAT EXTRACTION

Ronald W. Kock, Wyoming, Ohio; Peter G. Gosselin, Springfield, Mass., and H. Norman Reiboldt, College Corner, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 8, 1989, Ser. No. 320,344
Int. Cl.[5] A23N 4/24
U.S. Cl. 99—516 11 Claims



1. An apparatus for separating juice sacs from the radial membranes of a peeled chunk of fruit, said apparatus comprising:

(a) a fluid impingement chamber for accommodating said peeled fruit chunk such that said peeled fruit chunk is free to rotate;

(b) means for inserting said peeled fruit chunk into said fluid impingement chamber;

(c) means for injecting a pressurized fluid into said chamber

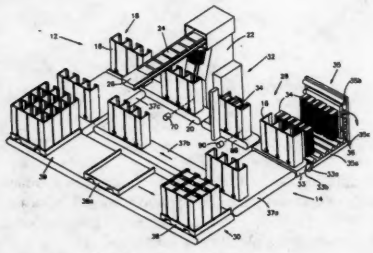
(d) such that said fluid impinges against and imparts a moment to said peeled fruit chunk, whereby said juice sacs are stripped from said radial membranes of said fruit chunk.

4,977,827

SIGNATURE HANDLING APPARATUS

Mohanijit S. Chandhoke, Plattsburgh, N.Y., and Robert A. Bryson, Sr., Huber Heights, Ohio, assignors to AM International Incorporated, Chicago, Ill.

Filed Jan. 17, 1989, Ser. No. 297,577
Int. Cl.[5] B65B 13/00
U.S. Cl. 100—7 14 Claims



1. A signature handling system for forming and handling stacks of signatures comprising:

stacker means for receiving signatures and for forming stacks of signatures;

a plurality of containers, each container comprising a linear array of fixedly interconnected and side-by-side cells each having an open side and an open upper end portion, said open sides of said cells facing in the same direction, each cell being capable of holding a stack of signatures; and

conveyor means for sequentially moving said containers to said stacker means with the open sides of the cells of each container facing toward said stacker means and for sequentially moving said containers away from said stacker means;

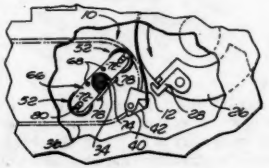
said stacker means including loader means for loading stacks of signatures into cells of said containers, said loader means including means extendable through open sides of cells of said containers for moving stacks of signatures downwardly into cells of said containers through open upper end portions of the cells, and an unloading station and a grouping station, said conveyor means being operable to convey said containers from said stacker means alternatively to said unloading station and to said grouping station, said grouping station including means for supporting a storage pallet and means to position multiple containers in an upright contiguous relationship on said storage pallet.

4,977,828

TRANSFER ROLLER DEVICE FOR PRINTING PRESSES

David D. Douglas, Garland, Tex., assignor to Printing Research, Inc., Dallas, Tex.

Filed Aug. 7, 1989, Ser. No. 390,379
Int. Cl.[5] B41F 9/00
U.S. Cl. 101—142 23 Claims



1. In combination with a sheet-fed rotary printing press having an elongated impression cylinder for printing one side of a sheet with ink; and a one and one half to one delivery system for transferring a printed sheet from the impression cylinder to a further processing station of the press, said delivery system including:

an elongated drive shaft extending parallel to said impression cylinder;

a pair of sprocket wheels mounted for rotation to said press and coupled to the lateral ends of said drive shaft;

a pair of endless and parallel conveyor chains, one trained about each of said sprocket wheels;

a plurality of elongated gripper bars coupled to said chains at spaced locations therealong and extending laterally therebetween parallel with said drive shaft;

a plurality of grippers laterally spaced along said gripper bar and operable to engage the leading edge of a sheet at the impression cylinder and pull said sheet from the impression cylinder, said gripper bars being positioned along said gripper chain such that said drive shaft and said sprocket wheels make one and one half complete revolutions between passage of each gripper bar; and

a transfer device for engaging and supporting the wet ink side of said sheet pulled from said impression cylinder by said grippers, said transfer drive comprising a frame drivingly coupled to said drive shaft and at least two elongated cylindrical rollers mounted to said frame and projecting radially outwardly of said drive shaft, said rollers being mounted for free rotation about axes extending parallel to said drive shaft and disposed to engage and support said wet ink side of said sheet during said transfer.

4,977,829

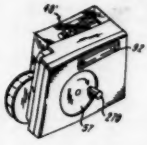
PRINTING APPARATUS WITH FINGER-ENGAGEABLE RECESS PROVIDING A CARRYING HANDLE

Orville C. Huggins, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 576,091, Feb. 1, 1984, Pat. No. 4,635,547, which is a division of Ser. No. 349,498, Feb. 17, 1982. This application Jun. 30, 1986, Ser. No. 880,530

Int. Cl.[5] B41F *1/08*

U.S. Cl. 101—292 1 Claim



1. Table-top printing apparatus, comprising: a generally L-shaped housing having a generally vertical upper portion and a generally horizontal lower portion, the upper portion having a vertical wall, means mounted by the housing for supporting a supply roll of a web of record members, a print head mounted for straight line movement on the outer surface of the vertical portion, a feed finger movably mounted on the horizontal portion and engageable with the web, means for moving the print head and the feed finger in sequence, and a finger-engageable recess formed in the upper region of the vertical wall to provide a carrying handle.

4,977,830

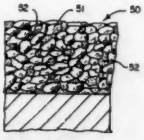
HYDROPHOBIC AND OLEOPHILIC MICROPOROUS INKING ROLLERS

Thomas A. Fadner, La Grange, Ill., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Apr. 27, 1989, Ser. No. 343,556

Int. Cl.[5] B41F *31/00*

U.S. Cl. 101—350 16 Claims



1. A wear-resistant ink metering roller possessing oleophilic and hydrophobic properties comprising:

a. a base roller of preselected strength, diameter and length having an outer surface of substantially cylindrical shape:

b. a substantially continuous microporous ceramic layer integral to the outer surface of said base roller, said microporous ceramic layer defining an interconnecting network of openings that permeate substantially the entire volume of said ceramic layer; and

c. a material infused with said ceramic layer which produces an oleophilic and hydrophobic reaction product of said microporous ceramic layer with said material, said material selected from the group consisting of a titanate coupling agent and a silane coupling agent.

4,977,831

SYSTEM AND METHOD FOR ZONAL FOUNTAIN CONTROL IN A PRINTING PRESS

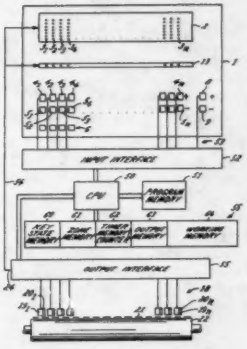
Claus Walter, Glauburg, Fed. Rep. of Germany, assignor to Man Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Aug. 1, 1989, Ser. No. 388,150

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1988, 3826383

Int. Cl.[5] B41F *31/02*

U.S. Cl. 101—365 24 Claims



1. A system for controlling fountain adjustments in a printing press, the press having a plurality of adjusters disposed along the fountain for making incremental adjustments across the fountain, the system comprising the combination of:

a control panel having a plurality of keys arranged in pairs related to the respective adjusters for bidirectional control of the associated adjuster;

zone selection means for detecting actuation within a predetermined time interval of both keys in a pair and as a result thereof initiating a zone selection operation;

zone definition means for detecting the actuation of a further key during a zone selection operation and defining zone boundaries as the adjusters corresponding to the actuated key pair and the further actuated key; and

zone adjustment means responsive to actuation of at least one key in the zone for adjusting all of the adjusters in the defined zone.

4,977,832

METHOD AND APPARATUS FOR COORDINATING A PRINTING PRESS CONTROL WITH A HARD COPY IMAGE

Claus Walter, Glauburg, Fed. Rep. of Germany, assignor to Man Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 389,315

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826385

Int. Cl.[5] B41F *31/02*

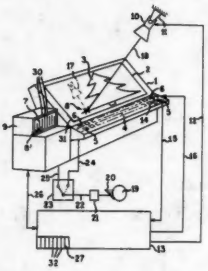
U.S. Cl. 101—365 13 Claims

1. A system for coordinating a zonal control in a printing press to a hard copy image of a printed form, the system comprising, in combination:

a support having register means for positioning and supporting the hard copy image;

electronic memory means having control zones for controlling the respective zones of the printing press to produce reproductions of the image, the electronic memory means storing control information for the respective zones but not storing the actual image pattern;

optical means for projecting a mark onto the hard copy image registered on the support to identify a selected image point, optical control means for traversing the mark across the registered image and for producing coordinate information relating to the image point identified by the projected mark; and



translating means for translating the coordinate information into control information for the control zones and storing the control information in the electronic memory means thereby to coordinate hard copy image points with the control zones which control the reproduction of the image.

4,977,833

LITHOGRAPHIC PLATE FASTENING APPARATUS OF PRINTING PRESS

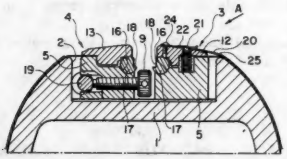
Toyoshi Inage, Kurashiki, and Kiyoshi Ito, Niihama, both of Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 400,228

Claims priority, application Japan, Mar. 17, 1989, 01-29729[U]; Mar. 17, 1989, 01-29730[U]; Mar. 17, 1989, 01-29731[U]

Int. Cl.[5] B41F *1/28*

U.S. Cl. 101—415.1 **5 Claims**



1. A lithographic plate fastening apparatus of a lithographic plate positioner for a plate cylinder of a printing press for fastening a combination of a lithographic plate and a mount plate, said lithographic plate having at least one reference hole and being positioned on top of said mount plate, the lithographic plate positioner including a bite-side plate vise and a trailing-side plate vise both placed in a groove defined along the axis of the plate cylinder, the top portion of each of the plate vises having the clamping plate clamping a mount plate, the lithographic plate fastening apparatus comprising:

a plate positioning reference pin provided on the clamping plate of the bite-side plate vise and tightly fitting a reference hole defined in a lithographic plate and a lithographic plate-retaining plate mounted on the top surface of the clamping plate placed above the plate positioning reference pin, the retaining plate depressing the top surface of the lithographic plate fitting the plate positioning reference pin.

4,977,834

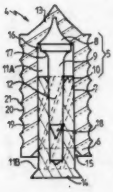
FIREARMS AMMUNITION, PARTICULARLY GAME-SHOOTING AMMUNITION

Jean-Pierre Denis, La Croix aux Vents 3bis, Rue Jomard, 78380 Bougival, France

Filed Aug. 28, 1989, Ser. No. 399,193

Int. Cl.[5] F42B *5/02, 5/045, 10/48, 30/02*

U.S. Cl. 102—439 **19 Claims**



1. Ammunition comprising a case containing a propulsive charge and a subcalibre projectile for a firearm, said projectile including an internal element, an external element, and anti-recoil engagement means between said internal element and said external element for connecting said internal and external elements to one another;

said internal element comprising a front part having a stopping shape, a rear shank connected to said front part, and a percussive mass at least partially fitted over said rear shank for translational movement of said percussive mass along said rear shank;

said external element comprising an aerodynamically-shaped outer casing covering the front and the side walls of said internal element in order to give the projectile good air-penetration; and

said anti-recoil engagement means so connecting said internal element and said external element to one another that, at least initially after firing of the projectile, said external element cannot advance more rapidly than said internal element.

4,977,835

BODY BOLSTER CENTER PLATE ASSEMBLY

Russell G. Altherr, Munster, Ind., assignor to Amsted Industries Incorporated, Chicago, Ill.

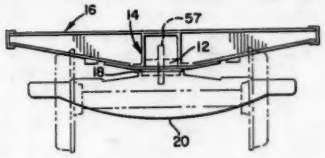
Filed Nov. 6, 1989, Ser. No. 432,220

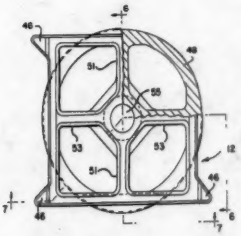
Int. Cl.[5] B61B *12/00*

U.S. Cl. 105—199.4 **6 Claims**

1. A body bolster center plate assembly for seated attachment within notches located proximate the underedge of the central pocket of a center sill of a railway vehicle, said center plate assembly comprising a circular cap section to cooperate with a truck bolster bowl, an integrated webbed reinforcing section located proximate and opposite of said circular cap section for insertion into said pocket of said center sill, and positioning means including one or more integrated lugs located proximate said point of attachment with said pocket of said center sill, said positioning lugs corresponding to the shape and location of said notches for receipt therein, such that

the surface of said positioning lugs are substantially flush with the surface of said underedge of said pocket of said center sill,





thereby providing for recessed seating of the center plate within the underedge of said pocket of said center sill.

4,977,836

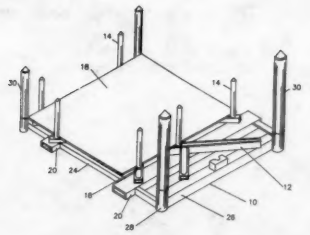
PARTS STACKING PALLET

Irvin D. Bond, 1027 Allen Rd., Clarkston, Mich. 48016

Continuation-in-part of Ser. No. 227,099, Aug. 1, 1988, Pat. No. 4,915,033. This application Feb. 23, 1990, Ser. No. 483,753

Int. Cl.[5] B65D *19/44*

U.S. Cl. 108—55.1 **13 Claims**



1. A pallet for supporting a plurality of similarly-shaped parts piled one above the other in a stacked position; said parts having a border with a common configuration; said pallet comprising:

a base that includes a plural number of hollow elongated horizontal tracks;

at least one non-rotary anchor block keyably and slidably arranged in each track for slidable adjustment therealong; each anchor block having a vertically extending threaded hole therein;

a socket member associated with each anchor block; each socket member having an external threaded area meshed with the hole threads, and a vertical straight-sided cavity centrally arranged within the external threaded area; and

a plural number of elongated upstanding locator pins, each locator pin including a non-circular plug element adapted to have a non-rotary fit in any one of the socket member cavities, each of said locator pins being turnable to rotate the associated socket member, such that the associated anchor block is moved vertically upwardly to grip an internal surface of the associated track.

4,977,837

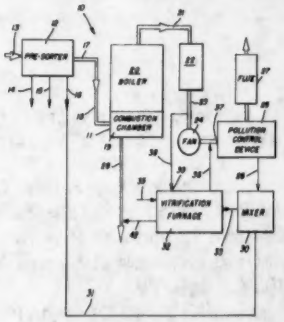
PROCESS AND APPARATUS FOR REDUCING HEAVY METAL TOXICITY IN FLY ASH FROM SOLID WASTE INCINERATION

Charles E. Roos, Nashville, and Ronald A. Quarles, Nolensville, both of Tenn., assignors to National Recovery Technologies, Inc., Nashville, Tenn.

Filed Feb. 27, 1990, Ser. No. 486,802

Int. Cl.[5] F23D *1/00*

U.S. Cl. 110—165 A **17 Claims**



1. A process for treating solid waste materials comprising the steps of:

(a) incinerating solid waste materials including at least some combustible materials to produce flue gases including fly ash, and bottom ash,

(b) introducing a glass material into a vitrification furnace,

(c) introducing said fly ash produced by said incinerating step into said vitrification furnace,

(d) melting said glass material in said vitrification furnace to cause said fly ash to combine with said molten glass material; and

(e) discharging said combined glass material and fly ash from said vitrification furnace to produce an inert vitrified ash product.

4,977,838

MODULAR DOOR JAMB AND LINTEL SYSTEM FOR INDUSTRIAL FURNACES

Kenneth L. Farrell, Frankfort; John A. Cona, Orland Park; Ronald Glugla, Mokena, and Lloyd G. Bly, Mokena, all of Ill., assignors to M. H. Detrick Co., Mokena, Ill.

Filed Aug. 7, 1989, Ser. No. 390,362

Int. Cl.[5] F26B *17/12*

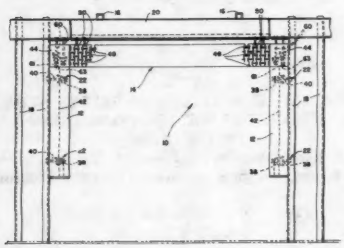
U.S. Cl. 110—173 R **16 Claims**

1. A modular door jamb and lintel system for an industrial furnance having an access door opening defined by structural means, comprising:

a pair of spaced, generally vertical door jambs of precast refractory material;

refractory lintel means assembled to and spanning the door jambs and combining therewith to define a frame for said access opening, the refractory lintel means being in the form of a cross support member and a wall of a plurality of self-supporting layers of interlocking refractory brick hanging from the cross support member;

fastening means on at least the door jambs to facilitate securing the door jambs to said structural means; and



hanger means on the lintel means to facilitate transporting and installing the lintel means in position at the access opening.

4,977,839

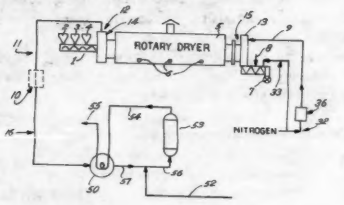
PROCESS AND APPARATUS FOR SEPARATING ORGANIC CONTAMINANTS FROM CONTAMINATED INERT MATERIALS

Edward G. Fochtman, Elmhurse; Peter S. Daley, Glen Ellyn; Milton Ader, Park Forest; Albert G. Plys, South Holland; Carl P. Swanstrom, Naperville, all of Ill., and James F. Grutsch, Hammond, Ind., assignors to Chemical Waste Management, Inc., Oak Brook, Ill.

Continuation-in-part of Ser. No. 143,891, Jan. 14, 1988, Pat. No. 4,864,942. This application Jun. 2, 1989, Ser. No. 360,365

Int. Cl.[5] F23G *5/12*

U.S. Cl. 110—346 **25 Claims**



1. A method for separating chemical contaminants from contaminated feed materials comprising, subjecting the feed materials contaminated with chemical compounds to a temperature effective to volatilize the contaminants, but below incineration temperature, with substantially continuous removal of evolved vapors having chemically oxidizable compounds, for a period of time sufficient to effect a desired degree of separation of the contaminants from the feed materials, wherein the evolved vapors are catalytically oxidized in the presence of steam at gas phase conditions, to convert substantially all of the chemically oxidizable compounds, thereby producing a gaseous reaction product comprising substantially steam and incondensable gases.

4,977,840

MINIMIZATION OF ENVIRONMENTAL WASTES

William A. Summers, Munster, Ind., assignor to American Waste Reduction Corporation, Munster, Ind.

Filed Sep. 20, 1989, Ser. No. 410,386

Int. Cl.[5] F23G *5/12*

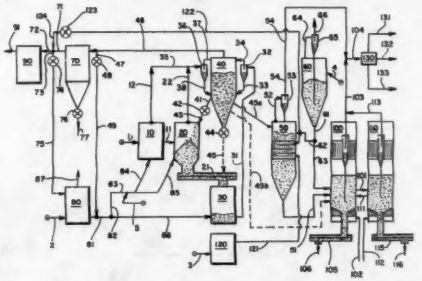
U.S. Cl. 110—346 **14 Claims**

1. An improved process for the conversion of environmental waste streams to useful and desirable products, comprising the steps of:

a) heating an environmental waste stream at a first elevated temperature within the range from about 240° to about 700° F., whereby dehydration occurs and moisture and dissolved gases are liberated therefrom to afford a dried waste stream feed material;

b) comminuting the dried waste stream feed material;

c) pyrolyzing the comminuted, dried waste stream feed material at a second elevated temperature within the range from about 700° to about 1400° F., whereby pyro-



lytic liquid and gaseous fractions are liberated to afford a waste stream solid residue, substantially comprising char and ash;

d) gasifying the waste stream solid residue at a third elevated temperature within the range from about 1400° to about 3000° F., whereby additional liquid and gaseous fractions are liberated to afford a solid residue product, substantially comprising ash;

e) recovering the solid residue product; and

f) separately recovering the pyrolytic liquid and gaseous fractions and the additional liquid and gaseous fractions.

4,977,841

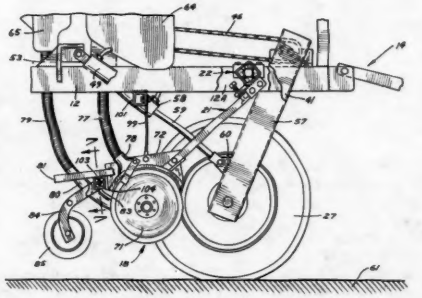
TORSIONAL JOINT ATTACHMENT FOR A SEED PLANTER

James R. Truax, 3717 Vera Cruz Ave. N., Minneapolis, Minn. 55422

Filed Dec. 1, 1989, Ser. No. 444,277

Int. Cl.[5] A01C *5/06*; A01B *35/28*

U.S. Cl. 111—62 **26 Claims**



1. A seed drill for opening a furrow in the ground and planting seed therein, comprising:

a frame having lateral sides and forward and rearward ends; first and second side wheels assembled to the frame sides;

a plurality of disk assemblies for engagement with the ground for forming predetermined depth furrows in the ground;

a disk assembly support bar extended laterally across the

frame from side to side and fixed for rotation relative to the frame for mounting the disk assemblies in a side-by-side relationship laterally across the frame;

a disk assembly mounting arm for each disk assembly, assembled at a first end to the disk assembly and assembled at a second end to the support bar and extending downwardly and rearwardly from the support bar;

a torsion joint connecting the second end of the disk assembly arm to the support bar;

said disk assemblies positioned by the disk assembly arms to be pressed into furrowing engagement with the ground by the torsion joint in order to form planting furrows in the ground upon forward movement of the frame;

a seed hopper mounted transversely on the frame, and a plurality of seed hoses extended from the seed hopper positioned for delivery of seed into furrows opened by the disk assembly;

each said torsion joint including a generally polygonal shaped housing disposed in surrounding and spaced relationship to a segment of the disk assembly support bar;

torsion spring means of an elastomer type material closely lodged between the interior of the housing and exterior surfaces of the support bar, positioned to be compressed upon rotational movement of the housing relative to the support bar;

means pivotally connecting the end of each disk assembly arm to the torsion joint housing permitting angular movement of the arm with respect to the housing from a first angular position with the arm positioning the disk assembly in trailing and furrowing relationship relative to the support bar, and a second angular position forward of the first angular position relative to the housing in order to compensate for permanent set in the torsion spring elements, and means for releasibly securing the second end of the disk assembly arm to the torsion joint housing in selected position.

4,977,842

OVERLOCK SEWING MACHINE WITH A THREADING MECHANISM FOR EASILY THREADING A LOOPER

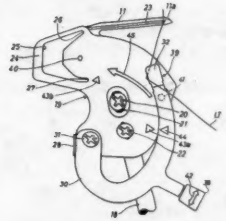
Hiroaki Fukao, Kasugai; Teruhiko Ohkita, Nagoya; Nobusuke Nagasaka, Aichi; Yukio Ichihara, Tajimi, and Toshio Sasaki, Inazawa, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed May 26, 1989, Ser. No. 357,263

Claims priority, application Japan, May 31, 1988, 63-135191; Feb. 23, 1989, 1-44944

Int. Cl.[5] D05B *57/00, 57/02*

U.S. Cl. 112—199 **13 Claims**



1. An overlock sewing machine including at least one vertically movable needle, a looper carriage connected to a rotating shaft, a looper having a groove and connected to the looper carriage at one end, and having a thread-receiving eye at the other end, and extending laterally over the looper carriage, where the vertically movable needle forms a chain stitch in cooperation with the looper, the overlock sewing machine comprising:

a thread-guiding member on the looper moving with the looper for guiding a thread into the thread-receiving groove;

a movable lever for moving both with the looper and relative to the looper; said movable lever having a free end; and

a thread-delivering member mounted on the movable lever, which moves between two positions, for holding the thread when in a first position corresponding to the thread-receiving eye, and for delivering the thread through the thread-guiding member when in a second position corresponding to the thread-guiding member.

4,977,843

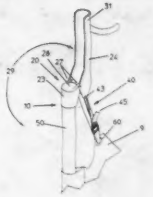
SAIL TENSIONING APPARATUS

Charles F. Ewert, 4218 Marylebone Way, Boise, Id. 83704, and Joseph D. Grooms, 2092 Parkside Dr., Boise, Id. 83712

Filed Aug. 28, 1989, Ser. No. 398,930

Int. Cl.[5] B63B *35/79;* **B63H** *9/04*

U.S. Cl. 114—109 **11 Claims**



1. Apparatus for placing selective tension on the luff of a sail of a sailboard having a hull, mast, and sail, said apparatus comprising:

mast attachment means;

a lever pivotally mounted to said mast attachment means by pivot means, said lever provided with an elongated hand portion; and

sail engagement means for connecting the sail to said lever, said lever movable from a tension free position to an over-center, self locking position for placing tension on the luff of the sail.

4,977,844

LIFE STEP STABILIZER

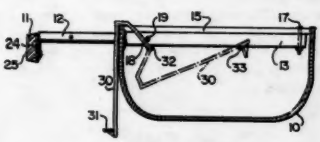
Richard Barr, 258 Centennial Drive, Renfrew, Ontario, Canada K7V 4J1

Continuation of Ser. No. 209,687, Jun. 21, 1988, abandoned. This application Dec. 13, 1989, Ser. No. 450,035

Claims priority, application Canada, Jun. 3, 1988, 568616

Int. Cl.[5] B63B *27/14*

U.S. Cl. 114—123 **7 Claims**



1. A stabilizing safety apparatus for small, single hulled water craft having a water line comprising:

at least one elongated float normally disposed above the water line along a side of the craft;

extensible means interconnecting said float and the craft for manually displacing said float from a first position above

the water line adjacent the hull of the craft to a second position remote from and substantially parallel with the hull; and

locking means for releasably retaining said float in at least said first and second positions;

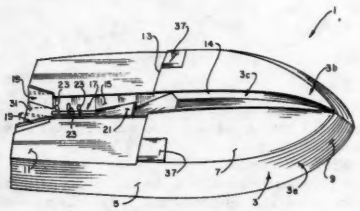
said extensible means comprising an inner arm slidably displaceable within an outer sleeve, said outer sleeve being attached transversely to said hull and including a pair of diametrically opposed radial bores on one end thereof for engagement with said locking means, said inner arm being provided on one end region adjacent said float with a radial bore which registers with the holes in said outer sleeve when said float is in said first position and further provided on its opposite end with a pin having limited radial travel to and from the periphery of said inner arm, said pin being constantly urged outwardly by spring means to engage one of said holes in said outer sleeve when said float is in said second position.

4,977,845

BOAT PROPULSION AND HANDLING SYSTEM

Carl E. Rundquist, St. Louis, Mo., assignor to F. William Rundquist, St. Louis, Mo. and Robert A. Rundquist, Northampton, Mass.

Filed Aug. 14, 1989, Ser. No. 393,280
Int. Cl.[5] B63B *1/18*; B63H *5/16*
U.S. Cl. 114—289 **25 Claims**



18. An improved boat construction, comprising:

a boat having an elongated hull with a bow and a stern and a bottom;

a well provided in the boat bottom and extending from the boat stern for a predetermined distance towards the boat bow;

powered impeller means contained within the well for engaging and pushing water backwards in a confined flow path within and beyond the well so as to thrust the boat forward;

vertical deflector means positioned rearwardly of the powered impeller means and operably attached to and within the the boat hull in the vicinity of the boat stern for engaging the backwardly moving water in the confined flow path so as to increase or decrease the size of the confined flow path of backwardly moving water emanating from the powered impeller means; and

horizontal deflector means positioned in the well immediately forward of the powered impeller means to direct more of less water to the powered impeller means,

whereby improved speed and controlled performance of the boat results.

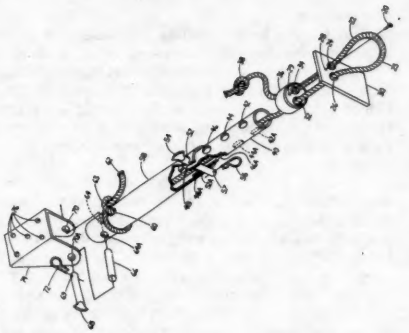
4,977,846

BOAT MOORING DEVICE

Joseph Landa, 7700 Creekbend #35, Houston, Tex. 77071, and Michael Landa, 9650 Meadowglen La., Houston, Tex. 77063

Filed Dec. 13, 1989, Ser. No. 449,981
Int. Cl.[5] B63B *21/00*
U.S. Cl. 114—230 **6 Claims**

1. A device for mooring a boat to a dock, comprising; a mounting bracket comprising a flat base and spaced-apart side members attached to said base; means for attaching said bracket base to a dock; each of said bracket side members having an opening axially aligned with one another; an adjustable mooring arm comprising an inner rigid hollow elongated member having a bore and first and second ends telescoping within an outer rigid hollow elongated member having a bore and second ends; said outer member having two axially aligned openings in said first end; pivot means pivotally securing said first end of said outer member between said bracket side members for angular displacement relative thereto about a generally horizontal axis extending transversely of said outer member; two vertically aligned openings in said second end of said



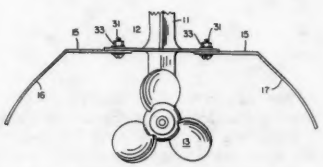
outer member; a plurality of vertically aligned pairs of openings, spaced-apart, located on a line between said first end and said second end of said inner member; adjustable means securing said inner member to said second end of said outer member at various lengths between the minimum and maximum lengths defined by the said plurality of vertically aligned pairs of openings in said inner member; an opening in said outer member adjacent to said first end of said outer member; a rope having first and second ends extending through the bore of said inner and outer members; said first end of said rope extending through said opening in said outer member; said second end of said rope extending through said second end of said inner member.

4,977,847

LIFT AND RUDDER FIN ATTACHMENT

Dana W. Bartlett, 4477 S. W. Fenwick Lane, Palm City, Fla. 34990

Filed Jul. 20, 1989, Ser. No. 382,275
Int. Cl.[5] B63H *21/26*
U.S. Cl. 114—274 **20 Claims**



1. A lift and rudder fin attachment for outboard engines and inboard engines with outboard drive, the said engines being for use in the propulsion of boats and of the class including a

generally horizontal and longitudinally extending cavitation plate which is mounted above a propeller driven thereby, the said attachment including a pair of cooperating left and right adjustable fins having leading and trailing ends and inboard and outboard sides, first means for attaching said fins to said cavitation plate at points adjacent said leading ends and said inboard sides thereof, second means for attaching said fins to said cavitation plate at points adjacent said trailing ends and said inboard sides thereof, the said pair of fins extending outboard from their points of attachment to the cavitation plate and generally downward whereby the said pair of fins encompass at least the upper portion of the propeller in spaced relationship, the configuration of the said fins being such that the amount of lift provided thereby may be varied by generally horizontal adjustment thereof around the said first attaching means, and the said first and second attaching means including means for allowing the said fins to be adjusted by generally horizontal movement thereof around the said first attaching means to thereby vary the amount of lift provided thereby.

4,977,848

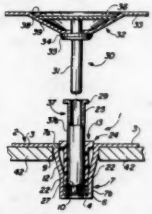
SEAT PEDESTAL MOUNT

Lesley B. Currey, P.O. Box 238, Monticello, Ark. 71655

Continuation-in-part of Ser. No. 239,327, Sep. 1, 1988. This application Apr. 24, 1989, Ser. No. 342,561

Int. Cl.[5] B63B *29/00*

U.S. Cl. 114—363 **18 Claims**



1. A seat pedestal mount for removably mounting a seat having a seat pedestal on a boat, comprising a base plate having a plate flange adapted for mounting on the boat; a bushing seat carried by said plate flange, said bushing seat having an internal bushing seat taper and adapted for recessing in the boat; bushing seat threads provided in the bottom of said bushing seat and a pedestal extension having one end adapted to receive the seat pedestal and a threaded nipple projecting from the opposite end of said pedestal extension, for threadably engaging said bushing seat threads; and a plastic insert adapted for insertion in said bushing seat, said plastic insert having an external bushing taper substantially matching said bushing seat taper and at least one pair of longitudinal slots provided in said plastic insert for removably locking said pedestal extension in said plastic insert, whereby when said plastic insert is inserted in said bushing seat, said threaded nipple engages said bushing seat threads when said opposite end of said pedestal extension is inserted in said plastic insert and the seat pedestal is inserted in said pedestal extension, such that the seat is securely and removably mounted on the boat.

4,977,049

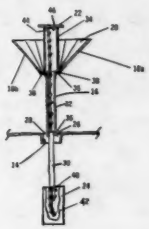
VEHICLE IN DISTRESS FLAG

Alice R. Brinton, 3200 Lockheed Blvd., Apt. 102, Alexandria, Va. 22306

Filed Mar. 21, 1990, Ser. No. 497,137

Int. Cl.[5] B60Q *1/52;* **G09F** *17/00*

U.S. Cl. 116—28 R **6 Claims**



1. A motor-vehicle distress flag assembly comprising:

an elongated compartment for housing a flag and a telescoping flagpole therein, said compartment being open at an exit end thereof;

a telescoping flagpole comprised of a plurality of tubularly-shaped flagpole elements being arranged with a smallest of said plurality of elements thereof anchored in the compartment with succeedingly larger elements being mounted thereon, said larger elements being slidable so that they can be extended out of the exit end of the compartment;

a flag mounted on an outside surface of a largest of said plurality of elements, means for automatically folding said flag against the outside surface of said largest element when said largest element is withdrawn into said compartment and means for automatically opening said flag to an expanded configuration when said largest element is moved out of said compartment;

a motivating means connected to said largest element for extending and withdrawing said flagpole;

said motivating means including a switch located in a cab of said motor vehicle for activating said motivating means;

whereby, when a driver of said motor vehicle is in distress, the switch is activated, thereby deploying said flag to signal the driver's distress to others.

4,977,850

SIGNAL APPARATUS

Morris T. King, 530 Central Ct., Indianapolis, Ind. 46205

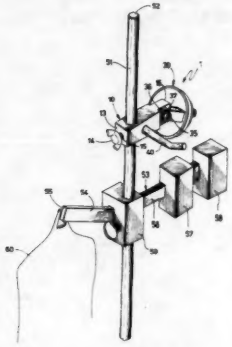
Filed Dec. 4, 1989, Ser. No. 445,528

Int. Cl.[5] G01F *23/00;* **G10K** *1/10*

U.S. Cl. 116—109 **1 Claim**

1. A signal apparatus comprising a vertical stand post having pivotally mounted thereon by suitable pivot connection means a balance beam having a first arm having a free end that is adapted to received a blood collection bag removably hung therefrom and a second arm having a counter-weight attached thereto a support arm having first and second ends, wherein the first end is adapted to be removably mounted on the stand post and wherein the second end is adapted to receive detachably coupled thereto a contact actuated audible signal device comprising a bell, the support arm having extending therefrom a hook adapted to receive a second bag removably hung thereon; the support arm comprising a rectangular member having a first hole therethrough near the first and thereof, said hole being adapted to receive the stand post inserted therethrough and connection means comprising a setscrew adapted to secure the support arm to the stand post and wherein the second end of the support arm is adapted to receive a bell removably attached thereto; a bell detachably coupled to the second end of the support arm; connection means for detach-

ably connecting the bell to the support arm; wherein the counter-weight is adapted to rotate upward about the pivot connection means when blood in a blood collection bag hung from the



first arm of the balance beam reaches a pre-determined level and the bell is adapted to receive a blow from the counter-weight when the counter-weight rotates upward.

4,977,851

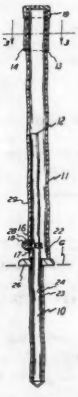
LIGHT-REFLECTIVE MARKER

Harry J. Anderson, 6815 Douglas Ave., Racine, Wis. 53402

Filed Dec. 20, 1989, Ser. No. 453,973

Int. Cl.[5] G01D *21/00*; F16B *7/10*; B25G *3/00*; F16D *1/00*

U.S. Cl. 116—209 12 Claims



1. A light-reflective marker comprising a stake to extend upright and having an upper end at an elevation above a datum level, a tubular member having a cylindrical wall and being telescopically disposed over said upper end of said stake and extending thereabove at a higher elevation and having an upper end, light-reflective material extending around said upper end of said tubular member, and releasably adjustable attachment means in contact with said stake and being accessible at the external circumference of said cylindrical wall and being in contact with said cylindrical wall for attaching said tubular member with said stake at any selected location along the upright length of said stake for positioning said light-reflective material at any selected elevation above the datum level.

4,977,852

METHOD OF SIMULTANEOUS MULTILAYER APPLICATION

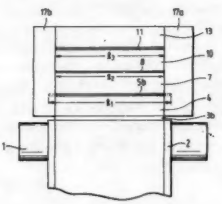
Seiji Ishizuka, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 20, 1988, Ser. No. 260,226

Claims priority, application Japan, Oct. 20, 1987, 62-262865; Oct. 20, 1987, 62-262866; Nov. 25, 1987, 62-295134

Int. Cl.[5] B05C *3/18, 5/02*

U.S. Cl. 118—411 5 Claims



1. A device for simultaneous multilayer application in which discrete liquid substances are applied as at least two mutually-overlaid layers to a continuously moving web, comprising:

a continuously moving web;

a backup roller around which said web moves;

a hopper for simultaneously applying upper and lower layers to said web, said hopper comprising first and second guide surfaces along which said liquid substances flow onto said web, and first and second slots having lengths extending in a direction substantially perpendicular to the movement of the web for individually supplying said liquid substances to each of said guide surfaces, wherein the width of the slot for supplying the lower layer is smaller than the width of the slot for supplying the upper layer such that the lower layer is smaller in thickness than the upper layer to thereby prevent streaks from forming along the applied layers.

4,977,853

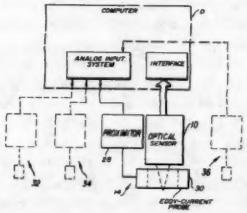
NON-CONTACT WET OR DRY FILM THICKNESS MEASURING DEVICE

Allan F. Falcoff, Lake Orion, Mich.; Frank S. Fountain, Wilmington, Del., and Donald K. Pusey, West Grove, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 1, 1989, Ser. No. 360,054

Int. Cl.[5] G01B *7/10, 11/14*

U.S. Cl. 118—665 11 Claims



4. A device for measuring the thickness of a film applied on a substrate without contacting the film, comprising:

(a) optical sensor means for measuring a first distance value between the top surface of the film and the device;

(b) inductive eddy-current proximity sensor means coaxial

with said optical sensor means for measuring a second distance value between the top surface of the substrate and the device, said proximity sensor having a central opening through which the optical sensor measures the first distance value whereby the proximity sensor does not interfere with the optical sensor;

(c) said optical sensor means and said proximity sensor means disposed on the same side of the substrate; and

(d) means electrically connected with said optical sensor means and said proximity sensor means for calculating the film thickness by comparing said first and second distance values.

4,977,854

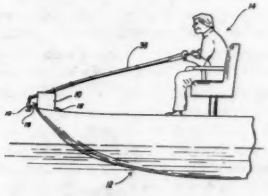
REMOTE DISPENSER FOR FISH ATTRACTANT

Thomas L. Marrs, R. R. 1, Box 59, Montrose, Ill. 62445

Filed Sep. 12, 1988, Ser. No. 243,254

Int. Cl.[5] A01K *97/04*

U.S. Cl. 118—683 **3 Claims**



1. A system for administering fish attractant to a fishing lure at the tip of a fishing pole remote from a fisherman holding the pole comprising a reservoir containing fish attractant, a spray nozzle for depositing said fish attractant onto said fishing lure in a direction away from said fisherman, and pumping means responsive to a switch controlled by said fisherman transferring said fish attractant through a transfer tube connecting said reservoir and said spray nozzle, wherein said switch is located in the vicinity of said spray nozzle and is a proximity switch activated by said fishing pole when said fishing lure is dangled near said spray nozzle by said fisherman, wherein said spray nozzle includes a slot portion in which said proximity switch is located, and wherein said spray nozzle is disposed beneath and directed away from said slot portion.

4,977,855

APPARATUS FOR FORMING FILM WITH SURFACE REACTION

Tadahiro Ohmi, Sendai, and Masaru Umeda, Tokyo, both of Japan, assignors to OHMI Tadahiro, Miyagi, Japan

PCT No. PCT/JP88/00066, § 371 Date Sep. 28, 1988, § 102(e) Date Sep. 28, 1988

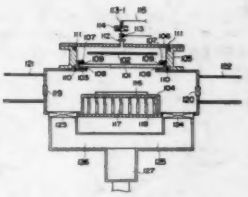
PCT Filed Jan. 28, 1988, Ser. No. 261,833

Claims priority, application Japan, Jan. 29, 1987, 62-19036

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—722 **5 Claims**

1. An apparatus for film formation with surface reaction comprising: a reaction chamber, a wafer susceptor in said chamber for supporting a wafer, a vacuum exhaust system for exhausting said chamber, a stock gas supply for supplying stock gas to said chamber, and heating means for directly heating said susceptor, ceramic filter means positioned opposite said wafer susceptor in juxtaposed relation thereto for blowing stock gas uniformly upon a wafer being supported on said wafer susceptor without back diffusion of stock gas from said chamber through said ceramic filter, and means for activating said stock gas operatively associated with said chamber to thereby assure a higher probability of adsorption of said stock gas on the surface of a wafer whereby stock gas is used efficiently by said apparatus and stock gas products are prevented from building up on the inner walls of said reaction chamber.



4,977,856

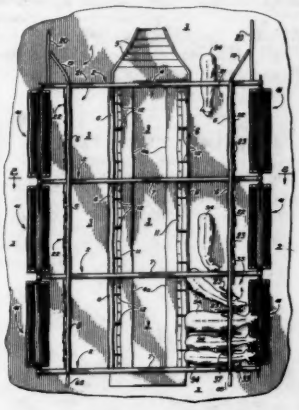
RAPID EXIT PARLOR SYSTEM

Eugene E. Norwood, Goldthwaite, Tex., assignor to Dairyland Automation, Inc., Sulphur Springs, Tex.

Filed Nov. 25, 1988, Ser. No. 275,897

Int. Cl.[5] A01K *1/12*

U.S. Cl. 119—14.03 **32 Claims**



1. A rapid exit parlor system for milking cows comprising a structure adapted to receive the cows, a plurality of pivoting entry panel means provided in said structure in spaced relationship, said pivoting entry panel means adapted to open and define spaced milking locations responsive to the passage of cows in sequence between said pivoting entry panel means into said milking locations, and roll gate means defining one end of said milking locations, said roll gate means horizontally rotatably mounted in said structure between a vertically closed position for containing the cows in said milking locations and a horizontally open position for releasing the cows from said milking locations.

4,977,857

PET CARRIER BAG

Nora Slawinski, 1800 N. Stanton, Apt. 605, El Paso, Tex. 79902

Continuation-in-part of Ser. No. 93,272, Sep. 15, 1987. This application Jan. 25, 1989, Ser. No. 301,127

Int. Cl.[5] A01K *13/00, 29/00*

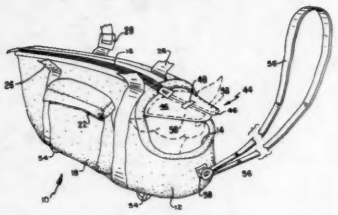
U.S. Cl. 119—19 **16 Claims**

1. A pet carrier for carrying small pets such as cats or dogs, comprising:

a sponge rubber padded, free standing bag-like body having

an inner surface, an outer surface, and a cut-out portion defined at a forward end thereof, said bag-like body further having a slit opening defined along an upper surface thereof and extending rearwardly from said cut-out portion;

fastening means for fastening said slit opening to close the same so that an animal can be secured within the bag-like body with its head adjacent the cut-out portion when the slit is closed;



a meshed snout portion mounted to said cut-out portion for defining a mesh covered snout opening; and

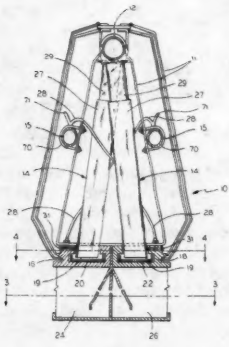
rain shield means including first and second rain shield flaps each mounted to a side of said slit opening so as to be pivotal from a first position extending forwardly from said cut-out portion to a second position wherein said shield flaps are disposed within the pet carrier, adjacent the interior surface thereof and means for coupling said first and second rain shield flaps in side by side relation when said flaps are in said first position.

4,977,858

ANIMAL FEEDING APPARATUS

Logan C. Langballe, Winnetka, Ill.; Bernhard Koszewa, Menomonee Falls, Wis., and Steen Blicher, Faaborg, Denmark, assignors to Biomat Feeding Systems, Inc., Evanston, Ill.

Filed Apr. 20, 1989, Ser. No. 340,949
Int. Cl.[5] A01K 5/02
U.S. Cl. 119—51.5 4 Claims



1. Apparatus for supplying predetermined amounts of dry feed and water to a group of animals comprising:

a plurality of animal feeding places;

dry feed supply means for supplying dry feed to said animal feeding places, said dry feed supply means being capable of filling a plurality of feed supply ducts with dry feed, each of said ducts having a lower outlet end, one of said feed supply ducts being provided for each of said feeding places;

feed discharge means between said lower outlet ends of said ducts and said feeding places for discharging said feed into each of said feeding places, said feed discharge means having at least one immovable, elongated rail, said rail having a first opening adjacent one side of each of said lower outlet ends of said ducts and a second opening adjacent an opposing side of each of said duct ends, said first and second openings being located over a single said feeding place;

feed pushing means arranged between the outlet ends of said feed supply ducts and said feed discharge means, said feed pushing means being movable so as to push predetermined amounts of dry feed from each feed supply duct;

liquid supply means for supplying aqueous liquid to each of said feeding places, said liquid supply means having a main pipe which extends along all of said feeding places, said main pipe having adjustment means for compensating for irregularities in the surface on which the apparatus is installed, so that said main pipe is level with respect to the horizontal;

a hydraulic motor coupled to a selected end of said feed pushing means;

said hydraulic motor having a vertically oriented reciprocable double-acting piston arranged within a cylinder, said piston being coupled to said feed pushing means by a lever having a pivot point, the moment arm between said piston and said pivot point being greater than the moment arm between said pivot point and said feed pushing means;

means coupling said liquid supply means to said hydraulic motor for supplying liquid to said motor under superatmospheric pressure as a driving medium therefor;

operating means for separately driving said motor to supply feed in an amount substantially proportional to the amount of liquid utilized as a driving medium for said motor; and

liquid discharge means for discharging the liquid from said motor and for dispensing all or a predetermined proportion of liquid into said feeding places;

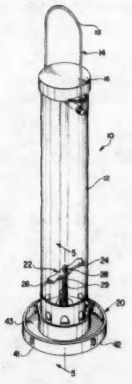
whereby the amount of feed discharged produces a mixture in said feeding places containing a predetermined proportion of liquid and feed.

4,977,859

SELECTIVE BIRD FEEDER

Peter Kilham, Mill Rd., Foster, R.I. 02825

Filed Nov. 20, 1989, Ser. No. 439,236
Int. Cl.[5] A01K 39/00
U.S. Cl. 119—52.2 11 Claims



1. A feed device for birds including an upper vertically disposed cylindrical container having upper and lower ends for the receipt and storage of seed and a closure assembly mounted at said container lower end such that seed from said container passes therethrough, said assembly including a downwardly

outwardly slanted lower wall on which said seed may collect in a pile therein and further including an upstanding circular, peripherally extending combination perch and seed collection tray disposed at the bottom thereof, said lower wall having an outer periphery and an intermediate wall extending upright from said outer periphery of said lower wall, said intermediate wall having a plurality of separate circumferentially-spaced feed openings therethrough such that seed from said pile is visible through said intermediate wall, said assembly further including an upright circular band frictionally mounted on the outside of said intermediate wall said band rotationally movable with respect to said intermediate wall, said band including a plurality of separate circumferentially-spaced openings such that selective rotation of said band partially blocks some of said feed openings in said intermediate wall and wherein said intermediate wall openings and said band openings each have laterally-spaced first and second side edges defining the lateral extent of said openings and wherein at least some of said opening side edges are angularly slanted such that superposing a slanted first side edge of said band with a second side edge of said lower wall forms a somewhat triangular limited feed access opening through which birds may pluck seed from said pile.

4,977,860

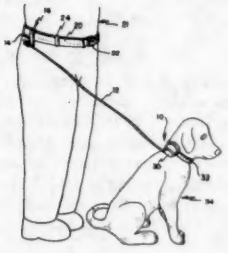
STAY ASSEMBLY FOR TETHERING ANIMALS

Robert A. Harwell, Rte. 2, P.O. Box 180-A, Johnsonville, S.C. 29555

Continuation-in-part of Ser. No. 364,890, Jun. 12, 1989. This application Feb. 16, 1990, Ser. No. 480,490

Int. Cl.[5] A01K 27/00

U.S. Cl. 119—109 11 Claims



1. A stay assembly attachable to a belt on a person and to a collar on an animal to be controlled, said assembly comprising:

a housing,

means for attaching said housing to said collar,

a flexible tether,

retracting means secured to one end of said tether for tensioning the same and operable to retract said tether into said housing,

clip means having a body defining a slot for receiving the other end of said tether and means for attaching said body to said belt, and

handle means located at said other end of the tether and including an enlarged member for engaging opposing edges of said slot to hold an adjacent segment of said tether in said slot at all times while said person is upright and said tether is tensioned by said retracting means,

said belt attaching means causing the slot in the body of said clip means to be held in a position relative to said belt such that said tether is quickly released from said clip means by one hand of said person gripping and moving said handle means so that said enlarged member no longer engages the edges of said slot and said adjacent segment of the tether is removed from said slot, and

the distance between said enlarged member of said handle means and a free end thereof defining a handle component held at the exterior of said housing by said enlarged member when an extensible section of said tether is fully retracted into said housing.

4,977,861

SUPERHEATER BUNDLE FOR A HORIZONTAL STEAM SEPARATOR-SUPERHEATER

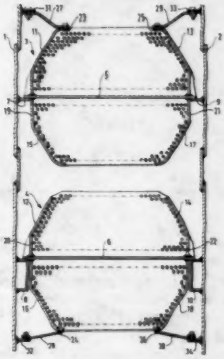
Alain Charbonnel, Vitry, and Jean-Claude Foucher, Bagneux, both of France, assignors to Societe Anonyme dite: Stein Industrie, Velizy-Villacoublay, France

Filed Dec. 13, 1989, Ser. No. 450,194

Claims priority, application France, Dec. 15, 1988, 88 16557

Int. Cl.[5] F22G 1/00

U.S. Cl. 122—483 3 Claims



1. A superheater bundle for a horizontal steam separator-superheater including a vertically upright steam tight frame comprising laterally opposed side partitions, said bundle comprising a pair of upper and lower irregular polygonal, steam tight tube array frames each comprising laterally opposed vertical sides integrally connected to respective laterally facing, oppositely sloping sides which converge towards each other and are spaced apart from each other, and said sloping sides having ends remote from said vertical sides defining at least a bottom steam inlet orifice for said lower steam tight tube array frame and a top steam outlet orifice for said upper steam tight tube array frame, said steam tight tube array frames being polygonal in shape and symmetrical about a common vertical plane of symmetry, an array of parallel tubes disposed in a triangular pitch inside each said steam tight tube array frame with at least two of the sloping sides of the polygon-shaped frames being parallel to sloping tube array segments formed by the pitch of the tubes whereby the superheater bundle fills the right cross section of said pair of steam tight tube array frames uniformly with the number of tubes per unit right cross section being optimum while avoiding any tendency of the steam to be superheated to flow preferentially along the exterior of said irregular polygon steam tight tube array frames.

4,977,862

ENGINE ROOM-COOLING CONTROL SYSTEM

Yasuyuki Aihara; Shuji Katoh; Shigeki Baba, and Eitetsu Akiyama, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 290,179

Claims priority, application Japan, Dec. 28, 1987, 62-199408[U]; Jun. 3, 1988, 63-138075

Int. Cl.[5] F01P 7/02

U.S. Cl. 123—41.12 11 Claims

1. A cooling control system for controlling cooling of an engine and an engine room, comprising:

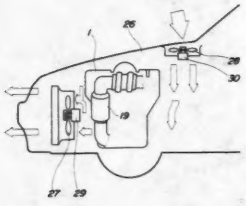
an engine room accommodating and engine;

cooling means arranged within said engine room for cooling said engine and said engine room, comprising a first cooling fan arranged at a first location within said engine room for cooling said engine, and a second cooling fan arranged at a second location within said engine room, said first cooling fan being capable of being selectively driven for rotation at a predetermined higher speed and at a predetermined lower speed;

driving means for electrically driving said cooling means, comprising first driving means for driving said first cooling fan, and second driving means for driving said second cooling fan;

temperature detecting means for detecting a temperature of said engine; and

control means for comparing a value of the temperature of said engine detected by said temperature detecting means



with a plurality of different predetermined values, and based upon results of the comparison, controlling said first and second driving means for driving said first and second cooling fans in a manner such that said first cooling fan alone is driven for rotation at said predetermined lower speed when the detected value of the temperature of said engine is above a first predetermined value and below a second predetermined value higher than said first predetermined value, said first cooling fan alone is driven for rotation at said predetermined higher speed when the detected value of the temperature of said engine is above said second predetermined value and below a third predetermined value higher than said second predetermined value, and said first cooling fan is driven for rotation at said predetermined higher speed and at the same time said second cooling fan is driven when the detected value of the temperature of said engine is above said third predetermined value.

4,977,863

AIR-COOLED INTERNAL COMBUSTION ENGINE HAVING CANTED COMBUSTION CHAMBER AND INTEGRAL CROSSOVER INTAKE MANIFOLD

Peter G. Kronich, Sheboygan, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

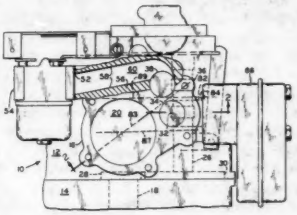
Filed Oct. 2, 1989, Ser. No. 415,895

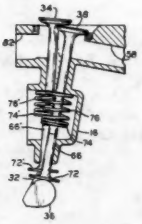
Int. Cl.[5] F02F *1/06, 1/30*

U.S. Cl. 123—41.69 **27 Claims**

1. In an air-cooled internal combustion engine having a crankcase, a cast cylinder block extending from the crankcase, a crankshaft rotatably journalled in the crankcase, a piston disposed for reciprocation in a bore in the cylinder block and drivingly connected with the crankshaft, a combustion chamber disposed adjacent an end of said cylinder block, a camshaft journalled for rotation in the crankcase and drivingly connected with the crankshaft, a cast intake valve chamber and a cast exhaust valve chamber each cast integrally with the cylinder block and communicating with the combustion chamber via a respective intake valve port and exhaust valve port, the intake and exhaust valve ports each being periodically occluded by a respective intake and exhaust valve drivingly connected with the camshaft for reciprocal motion in response to rotation of the camshaft, a fuel/air intake port disposed on an outer face of said cylinder block to one side of the cylinder block for connection to a carburetor, and an exhaust port disposed on an opposite outer face of the cylinder block for connection to a muffler, the improvement comprising:

an elongate intake cross-over passage cast integrally with the cylinder block and communicating the fuel/air intake port with the intake valve chamber, said intake cross-over





passage including an interior passageway delimited by interior walls which are substantially straight in longitudinal direction from the fuel/air intake port to a point of intersection with the intake valve chamber, whereby a casting core defining the interior walls of the intake cross-over passage during casting of the cylinder block can be non-destructively withdrawn subsequent to casting.

4,977,864

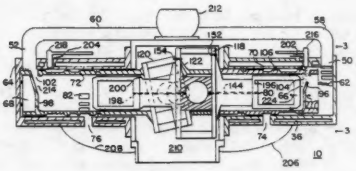
DIESEL ENGINE

Lloyd L. Grant, 1323 Karshner Rd., Puyallup, Wash. 98371

Continuation of Ser. No. 45,592, Jun. 4, 1979, abandoned. This application May 11, 1984, Ser. No. 609,480

Int. Cl.[5] F02B *59/00*

U.S. Cl. 123—50 B **3 Claims**



1. An engine comprising:

a first reciprocating cylinder;

a second reciprocating cylinder;

a piston housed within the first reciprocating cylinder;

a second piston housed within the second reciprocating cylinder;

a means of housing the first and second reciprocating cylinders;

a compression wall within the first reciprocating cylinder;

a compression wall within the second reciprocating cylinder;

a means of interjecting fuel at proper timing between the compression walls and the pistons to cause combustion and reciprocating horizontal movement between the first and second reciprocating cylinders and the first and second pistons;

a crankshaft;

a means of withdrawing exhaust from the engine;

a crankthrow affixed to the crankshaft;

a second crankthrow affixed to the first crankthrow;

a third crankthrow affixed to the second crankthrow;

three scotch blocks, each scotch block surrounding one crankthrow;

three scotch yokes, with each of the scotch blocks housed within one of the scotch yokes;

a means of securing the first reciprocating cylinder to the first and third scotch yokes, said scotch yokes housing the first and third crankthrows;

a means of securing the second reciprocating cylinder to the first and third scotch yokes, said scotch yokes housing the first and third crankthrows;

a means for securing the first and second pistons to the second scotch yoke, said scotch yoke housing the second crankthrow; and

the second crankthrow is 180° out of phase with the first and third crankthrows and is twice the diameter of the first and third crankthrows.

4,977,865

INTAKE SYSTEM FOR V-TYPE ENGINE

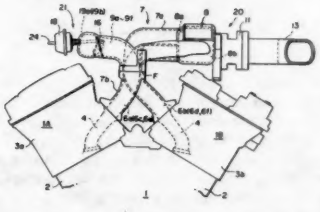
Tetsuo Hiraoka; Takenori Ohtsuka; Kazuaki Hokazono; Shinji Seike, and Tomohiro Sunada, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

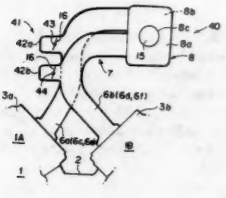
Filed Oct. 18, 1989, Ser. No. 423,205

Claims priority, application Japan, Oct. 19, 1988, 63-263319; Jun. 20, 1989, 1-155712

Int. Cl.[5] F02M *35/10*

U.S. Cl. 123—52 MB **13 Claims**





1. An intake system for a V-type engine having a plurality of cylinders formed in a pair of cylinder banks comprising a first volume chamber which is communicated with the atmosphere through a common intake passage, at least one throttle valve provided upstream of said first volume chamber to control flow from said common intake passage, discrete intake passages which branch off from the volume chamber and are connected to the respective cylinders, branch passages which branch off from the respective discrete intake passages, one or more second volume chambers each of which is communicated with at least two of the branch passages, on-off valves which are respectively provided in the branch passages and are opened and closed according to the operating condition of the engine, said first volume chamber being disposed above one of the cylinder banks and said second volume chamber or second volume chambers being disposed above the other cylinder bank.

4,977,866

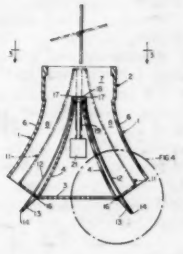
FLOW CONTROL SYSTEM FOR INTAKE MANIFOLD

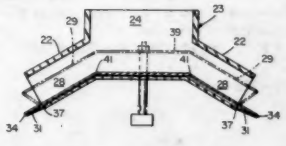
Don Wilkins, 218 6th NE., Cut Bank, Mont. 59427

Filed Mar. 21, 1990, Ser. No. 496,880

Int. Cl.[5] F02M *35/10*

U.S. Cl. 123—52 MV **8 Claims**





1. In combination with a runner for an internal combustion engine intake manifold, said runner comprising a gas flow passage defined by fixed walls extending along the gas flow path, gas flow control apparatus comprising;

an elongated movable wall member extending in substantial face-to-face relation with one of said fixed walls,

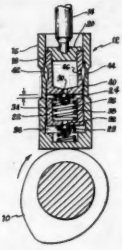
means mounting said movable wall member for movement longitudinally in said passage to increase and decrease the effective length of the passage and simultaneously toward and away from said one fixed wall to increase and decrease the effective transverse cross-sectional flow area of said passage, and

actuator means for adjusting and maintaining said movable wall member in a given position of adjustment.

4,977,867
SELF-ADJUSTING VARIABLE DURATION HYDRAULIC LIFTER

Jack L. Rhoads, P.O. Box 830, Taylor, Ariz. 85939

Continuation-in-part of Ser. No. 398,883, Apr. 3, 1990, Pat. No. 4,913,106. This application Apr. 2, 1990, Ser. No. 502,768
Int. Cl.[5] F01L 1/16, 1/24
U.S. Cl. 123—90.49 9 Claims



1. A self-adjusting controlled bleed-down variable duration hydraulic valve lifter comprising :

(a) a lifter body having a longitudinal cylindrical internal bore and a substantially closed lower end;

(b) an upper plunger axially slideable in said body and defining a main hydraulic oil chamber in the lower portion of said body;

(c) means permitting the entry of oil into said main chamber;

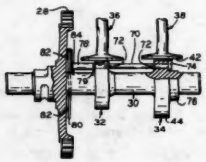
(d) a restricted oil bleed passageway permitting the egress of oil from said chamber at a predetermined rate; and,

(e) limit means defining the lowermost level to which said plunger travels in said body, such that at low engine RPM said upper plunger bottoms out at said lowermost level at some point during the valve opening cycle, said limit means comprises a second plunger slidable within said bore, and dividing said main chamber into an upper and a lower chamber, said lower plunger having a check valve for passing oil from said upper chamber to said lower chamber, and a lower spring biasing said lower plunger upward, and said lower plunger seats said upper plunger when adequate oil has exited said upper chamber.

4,977,868
MECHANICAL COMPRESSION RELEASE SYSTEM

Mark T. Holschuh, Fond du lac, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Jui. 12, 1989, Ser. No. 378,829
Int. Cl.[5] F01L 13/08
U.S. Cl. 123—182 20 Claims



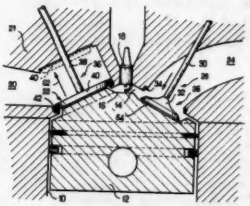
1. In an internal combustion engine having a combustion chamber, intake and exhaust valve means operable to respectively control the flow of a fuel/air mixture into the combustion chamber and the exhaust of gases therefrom, said intake and exhaust valve means including respective intake and exhaust valve lifters, a rotatable camshaft having a camshaft gear fixed thereon, and inboard and outboard camshaft lobes fixed on said camshaft, said inboard lobe being positioned axially on said camshaft between said camshaft gear and said outboard lobe, said inboard and outboard camshaft lobes being operable to engage the respective valve lifters to actuate said intake and exhaust valve means, a compression release mechanism comprising:

a rotatable pin having a bearing surface rotatably received in said inboard and outboard camshaft lobes, said pin having a cam surface thereon and position adjacent said outboard lobe, said cam surface being adapted to extend above said outboard lobe to engage one of said valve lifters when said engage said valve lifter when said revolvable pin is rotated to a second position in response to high engine speed, and a flyweight means connected to said rotatable pin and positioned between said inboard camshaft lobe and said camshaft gear, said flyweight means being revolvable with said camshaft for rotating said pin cam surface to said first position below a threshold engine speed and for rotating said pin cam surface to said second position above said threshold engine speed, said pin being enclosed by both said cam lobes over greater than 180° of the pin bearing surface, whereby said pin is retained at two points along its axis against centrifugal forces produced by the rotating camshaft.

4,977,869
VALVE ASSEMBLY FOR INTERNAL-COMBUSTION ENGINES

Jean-Claude Fayard, Lyons, France, assignor to ELF France, Courbevoie, France

Filed Feb. 12, 1990, Ser. No. 478,944
Claims priority, application France, Feb. 17, 1989, 89 02127
Int. Cl.[5] F01L 3/00
U.S. Cl. 123—188 S 6 Claims



1. Valve assembly (22) intended for closing a combustion chamber (14) of an internal-combustion engine and comprising a valve (36) and a valve seat (42), the valve lifting off from its seat in order to open the combustion chamber (14) by moving away from the latter, characterized in that the valve seat (42) is designed to move relative to the combustion chamber (14) under the effect of the pressure prevailing in this chamber and thereby to reinforce the closing of the valve assembly.

4,977,870
INTERNAL COMBUSTION ENGINE

Hiroshi Hashimoto, Chigasaki; Tatsuo Aruga, Kawasaki; Eiichi Fujisawa, and Yoshinari Obana, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 8, 1990, Ser. No. 477,084
Claims priority, application Japan, Feb. 17, 1989, 1-37800
Int. Cl.[5] F02F 7/00; F01M 1/00
U.S. Cl. 123—195 C 14 Claims

1. An internal combustion engine comprising:

a cylinder block having lubrication oil passages formed therein, said oil passages having a cylinder block opening at one longitudinal end of said cylinder block;

a crankshaft operatively installed in said cylinder block, said crankshaft having one end portion exposed to the outside

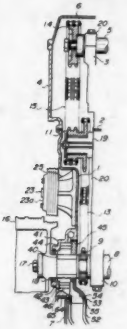
of said cylinder block from said one longitudinal end of the same; and

a front cover structure attached to said one longitudinal end of said cylinder block,

wherein said front cover structure includes:

a first portion having an oil pump housing formed thereon;

an oil pump means driven by the exposed end portion of said crankshaft, said oil pump means being received in said oil pump housing;



a second portion having first and second oil passages formed therein, said first oil passage having one end connected to an outlet port of said oil pump means, said second oil passage having one end which is mated with said cylinder block opening; and

an oil filter fixed to said second portion and fluidly connected to the other ends of said first and second passages.

4,977,871

REMOVAL OF CARCINOGENIC HYDROCARBONS FROM USED LUBRICATING OIL USING ACTIVATED CARBON

Darrell W. Brownawell, Scotch Plains, N.J.; Donald J. Norris, Clearwater, Canada, and Harold Shaub, Berkeley Heights, N.J., assignors to Exxon Chemical Patents, Inc., Linden, N.J.

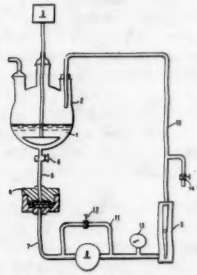
PCT No. PCT/GB88/00009, § 371 Date Nov. 7, 1988, § 102(e) Date Nov. 7, 1988, PCT Pub. No. WO88/05072, PCT Pub. Date Jul. 14, 1988

PCT Filed Jan. 7, 1988, Ser. No. 250,617

Claims priority, application United Kingdom, Jan. 7, 1987, 8700241

Int. Cl.[5] F01M *1/00*

U.S. Cl. 123—196 A **27 Claims**



1. A system for the selective removal of polynuclear aromatic hydrocarbons containing 3 or more aromatic rings from lubricating oil used to lubricate the engine of a motor vehicle which comprises activated carbon positioned within the lubricating system and through which the lubricating oil circulates, said activated carbon being selective to removing polynuclear aromatic hydrocarbons containing 3 or more aromatic rings from the lubricating oil.

4,977,872

INJECTOR CLEANING/TESTING APPARATUS

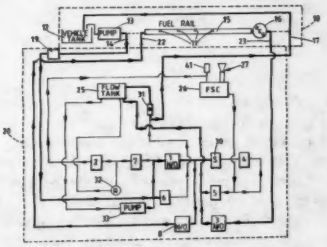
Robert Hartopp, Coventry, England, assignor to Automated Engineering Systems Limited, Coventry, United Kingdom

Filed Oct. 6, 1989, Ser. No. 418,191

Claims priority, application United Kingdom, Oct. 8, 1988, 8823693

Int. Cl.[5] B08B *3/08*; F02B *77/00*

U.S. Cl. 123—198 A **9 Claims**



1. Injector cleaning/testing apparatus comprising supply means for connection with the fuel supply system of a vehicle, the supply means being arranged to feed fuel and/or cleaning fluid to the fuel supply system for discharge through vehicle fuel supply injectors; actuating means for the injectors whereby the injectors are individually actuable; measuring means for measuring the rate of flow of fuel through individual injectors; and control means for controlling the operation of the supply means, the actuating means and the measuring means; the measuring means including pump means for pressurizing the supply of fuel to the injectors, valve means for isolating the pressurized fuel supply, and pressure measuring means for measuring the pressurized fuel supply to the injectors, the pressure measuring means being coupled to calculating means whereby the rate of change of pressure detected by the measuring means is calculated so that when the valve means is operated and the injector is actuated to an open condition to pass the pressurized fuel therethrough the calculating means provides a signal according to the rate of change of the fuel pressure which corresponds to the rate of flow of fuel through the injector.

4,977,873

TIMING CHAMBER IGNITION METHOD AND APPARATUS

Mark A. Cherry, El Cajon, Calif., and Clifford L. Elmore, 1568 Honey Hill Ter., El Cajon, Calif. 92020, assignors to Clifford L. Elmore, El Cajon, Calif.

Filed Jun. 8, 1989, Ser. No. 363,523

Int. Cl.[5] F02M *19/00*

U.S. Cl. 123—267 **28 Claims**

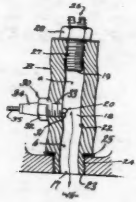
1. A method of ignition in internal combustion engines having a compression cycle and ignition of a combustible fuel-air mixture in a combustion chamber followed by a power cycle, and including;

the first step of providing a closed chamber in open communication with the combustion chamber for penetration

therein of a pressure front of the combustible fuel-air mixture,

the second step of positioning an igniter means at a depth of pressure front penetration of said combustible fuel-air mixture into the closed chamber for contact therewith at a determined compression of said combustible fuel-air mixture,

the third step of transferring the pressure front of combustible fuel-air mixture from the combustion chamber and into the closed chamber during the compression cycle,



the fourth step of capturing a volume of previously burnt non combustible gasses in the closed chamber for occlusion of the igniter means and for depression as a spring,

and the fifth step of depressing said captured previously burnt non combustible gasses with the penetrating pressure front of combustible fuel-air mixture until contact thereof with the igniter means, whereby ignition occurs and is transferred into the combustion chamber for continued burning to effect the power cycle and leaving burnt non combustible gasses in the closed chamber.

4,977,874

COMBUSTION CHAMBER

Renato Ongetta, Desenzano Del Garda, Italy, assignor to Borgo-Nova SpA, Alpignano, Italy

Filed Oct. 10, 1989, Ser. No. 419,085

Claims priority, application Italy, Oct. 27, 1988, 67968 A/88

Int. Cl.[5] F02B *19/06*

U.S. Cl. 123—269 8 Claims

1. A combustion chamber formed in the crown of a piston for an indirect injection diesel engine, said chamber comprising an entry channel adjacent the gas efflux of a precombustion chamber, the channel leading into four curved branches which generate vortices in the burning charge and which vortices are coherent and mutually self-reinforcing.

4,977,875

TWO-STROKE-CYCLE UNIFLOW SPARK-IGNITION ENGINE

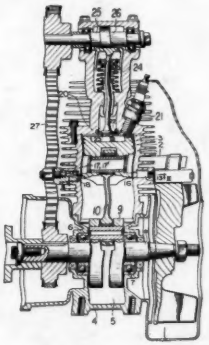
Selichiro Kumagai, Tokyo; Michikata Kono, Hachioji; *Masakazu Okai, Kanagawa, and Hisashi Inaga, Tokyo, all of* Japan, assignors to Kioritz Corporation, Tokyo, Japan

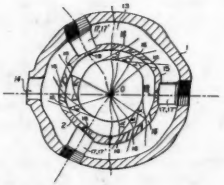
Filed Apr. 18, 1989, Ser. No. 339,740

Claims priority, application Japan, May 25, 1988, 63-125865

Int. Cl.[5] F02B *3/00*

U.S. Cl. 123—299 3 Claims





1. A two-stroke-cycle uniflow spark-ignition engine comprising

a cylinder defining a cylinder chamber;

a cylinder head provided at the top of said cylinder;

at least three nozzles located in a plane perpendicular to the axis of said cylinder and aimed to inject fuel therefrom to have the fuel from all three nozzles self collide at a point in said cylinder chamber;

a piston located in said cylinder chamber for reciprocating within said cylinder chamber;

an annular scavenging chamber formed in said cylinder around the entire circumference of said cylinder chamber;

a fluid sucked and pressurized by a compressor driven by the engine delivered to said annular scavenging chamber to be accumulated therein;

a plurality of scavenging ports formed in said cylinder and capable of opening into said cylinder chamber toward the end of a descending stroke of said piston, said scavenging ports being in substantially the same said plane containing said nozzles;

said fluid within said annular scavenging chamber being discharged therefrom through said opened scavenging ports into a portion of said cylinder chamber which is above said piston, in a swirling uniflow stream;

said discharged fluid serving as a scavenging fluid that flows in said swirling uniflow stream;

an ignition plug for igniting and causing combustion of a

mixture compressed within said cylinder chamber during an ascending stroke of said piston;

and an exhaust valve provided in said cylinder head and capable of opening toward the end of a descending stroke of said piston that is concurrent with explosion and expansion of combustion gas, the opened exhaust valve allowing burned exhaust gas to be expelled;

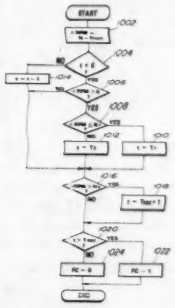
said piston having a recess therein forming a space in which said compressed mixture from said nozzles and said scavenging ports undergoes combustion.

4,977,876

FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH FUEL CUT-OFF CONTROL AT HIGH ENGINE SPEED RANGE SUPPRESSIVE OF RECOVERY SHOCK UPON FUELS RESUMPTION

Yasutoshi Nanyoshi, Yokosuka, and Sadao Takase, Yokohama, both of Japan, assignors to Nissan Motor Company, Ltd., Yokohama, Japan

Continuation of Ser. No. 165,654, Mar. 8, 1988, abandoned. This application Apr. 5, 1990, Ser. No. 506,511
Int. Cl.[5] F02D 33/00
U.S. Cl. 123—333 23 Claims



1. A fuel injection control system for an internal combustion engine, for performing fuel cut-off operation for blocking fuel delivery in response to an excessively high engine speed over a predetermined high engine speed criterion for protecting the engine, comprising:

a fuel injection system including a fuel injection valve for delivering a controlled amount of fuel at a controlled timing;

a sensor means for monitoring engine driving condition parameters including an engine revolution speed; and

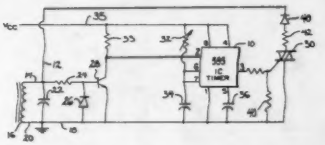
a controller, associated with said fuel injection system for controlling fuel delivery amount and fuel injection timing based on the engine driving parameters monitored by said sensor means, said controller being responsive to the engine revolution speed higher than a predetermined fuel cut speed which is set in the vicinity of said predetermined high engine speed criterion, to initiate fuel cut-off operation to intermittently block fuel delivery through said fuel injection valve.

4,977,877

SPEED LIMITER FOR INTERNAL COMBUSTION ENGINES

Richard A. Dykstra, Cedar Grove, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Dec. 21, 1989, Ser. No. 454,378
Int. Cl.[5] F02P 9/00
U.S. Cl. 123—335 9 Claims



1. A speed limiter for internal combustion engines, said engine having a magneto ignition system and an ignition primary winding that outputs an ignition pulse, said primary winding including a first terminal and being inductively coupled to a secondary winding to which a spark plug is connected, said speed limiter comprising:

signal conditioning means for receiving a winding signal from said primary winding and for outputting a conditioned signal;

timer means for receiving said conditioned signal and for outputting a single control signal per ignition cycle; and

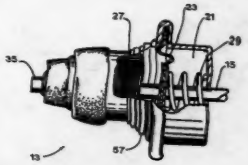
a first switch means, connected in circuit to said first terminal and to said timer means, for receiving said single control signal and for activating in response to said single control signal to short said ignition pulse thereby preventing said spark plug from firing.

4,977,878

CARBURETOR IDLER ASSIST SYSTEM

Larry M. Hubbard, Jr., 6500½ San Miguel, Bonita, Calif. 92002

Filed Oct. 28, 1988, Ser. No. 264,060
Int. Cl.[5] F02M 3/05; F02D 41/08
U.S. Cl. 123—339 8 Claims



1. A device for interacting with a throttle of a carburetor to produce a second, constant idle speed comprising:

(a) a ram arm engaging said throttle when said ram arm is in a forward position;

(b) a vacuum-operable diaphragm attached to said ram arm for moving said ram arm to said forward position upon application of vacuum pressure;

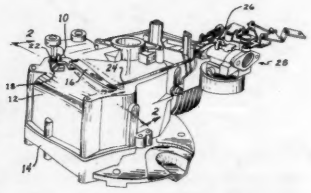
(c) solenoid-operated means for further maintaining said ram arm in said forward position; and

(d) means for changing the positioning of said device in relation to said throttle.

4,977,879
MECHANICAL GOVERNOR FOR INTERNAL COMBUSTION ENGINES

Gregory R. Schmidt, Port Washington, and Peter Hotz, Milwaukee, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Feb. 12, 1990, Ser. No. 479,084
Int. Cl.[5] F02D 9/08
U.S. Cl. 123—376 7 Claims



1. A speed governor for an internal combustion engine having a rotating crankshaft, an upper engine housing having a top side and a fuel-delivery control means for controlling the amount of fuel delivered for engine combustion, said governor comprising:

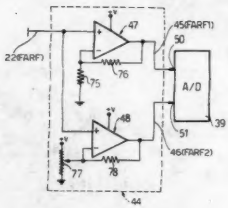
movement means, interconnected with said crankshaft, for moving in response to rotation by said crankshaft; and

arm means, extending through the top side of the upper engine housing and interconnected with both said fuel-delivery control means and with said movement means, for operating said fuel-delivery control means in response to movement by said movement means.

4,977,880
SYSTEM FOR CONVERTING A SIGNAL FROM A LINEAR TRANSDUCER FOR ENABLING PARAMETER ACQUISITION TO VARYING DEGREES OF ACCURACY

Silverio Bonfiglioli, Zola Predosa, and Massimo Fato, Modena, both of Italy, assignors to Weber S.r.l., Turin, Italy

Filed Feb. 7, 1989, Ser. No. 307,782
Int. Cl.[5] F02D 41/02
U.S. Cl. 123—488 17 Claims

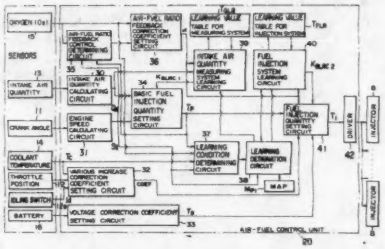


1. A system for converting a signal (22) from a substantially linear transducer (23) detecting a parameter on a motor vehicle electronic injection system, and so enabling parameter acquisition to varying degrees of accuracy; characterised by the fact that it comprises electronic means (44) comprising at least one amplifier (47, 48) for supplying at least one signal (FARF1, FARF2) differing in slope as compared to that (FARF) supplied by said transducer (23), processing means (36) for determining the value of said parameter to a degree of accuracy depending on the modified slope of said signal (FARF1, FARF2) from said electronic means (44), said electronic means (44) having at least two amplifiers (47, 48) supplied with said signal (22) from said transducer (23), and supplying respective output signals (45, 46) to said processing means (36), said processing means further having means (92, 94) for storing the output signals (45, 46) from said amplifiers (47, 48); means (95, 96) for selecting a respective said signal (FARF1, FARF2); means (96) for determining whether the value of said parameter falls within a range wherein said signals (FARF1, FARF2) overlap; and, if it does, means (97) for determining whether said signal (FARF1) has been stored in (FARF) memory register.

4,977,881
AIR-FUEL RATIO CONTROL SYSTEM FOR AUTOMOTIVE ENGINE

Kunihiro Abe, and Masanori Sakamoto, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 18, 1990, Ser. No. 466,763
Claims priority, application Japan, Jan. 19, 1989, 1-10680; Jan. 20, 1989, 1-12845
Int. Cl.[5] F02M 51/00
U.S. Cl. 123—489 5 Claims



1. An air-fuel ratio control system for an automotive engine, having an engine speed sensor for detecting an engine speed, an air-fuel ratio sensor for detecting the condition of an air-fuel ratio of the engine, a fuel injection system with an injector for injecting fuel into a combustion chamber of said engine, and an intake air quantity measuring system including an intake air quantity sensor for detecting an intake air quantity; the control system comprising

designation means for designating a learning region corresponding to an engine operating condition by selecting one of a first learning region for the measuring system and a second learning region for the injection system;

first learning means responsive to a selection of said first learning region by said designation means for learning a first correction quantity in said measuring system from a discrepancy amount between a reference air-fuel ratio and an actual air-fuel ratio calculated in dependency on a signal output from said air-fuel ratio sensor;

second learning means responsive to a selection of said second learning region by said designation means for learning a second correction quantity in said injection system from said discrepancy amount; and

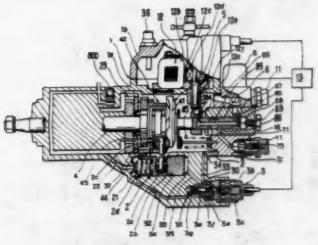
fuel injection quantity setting means for calculating a basic fuel injection quantity in dependency on said engine speed and for setting an actual fuel injection quantity with said first correction quantity learned by said first learning means and said second correction quantity learned by said second learning means.

4,977,882

DISTRIBUTOR TYPE FUEL INJECTION PUMP

Hisashi Nakamura; Ken-ichi Kubo, and Toshiro Hirakawa, all of Saitama, Japan, assignors to Diesel KIKI Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 396,984
Int. Cl.[5] F02M 39/00
U.S. Cl. 123—502 10 Claims



1. A distributor type fuel injection pump comprising:

(a) a pump housing having a hollow body, a cover covering an upper opening in said body, and a distributor head closing a side opening in said body;

(b) a pump chamber formed in said pump housing;

(c) a plunger barrel rigidly secured to said distributor head in such a manner that one end of said plunger barrel faces said pump chamber, said plunger barrel having a feed passage for leading fuel from said pump chamber and a plurality of outlet ports which are axially offset from said feed passage, said outlet ports communicating with a delivery valve attached to said distributor head;

(d) a feed pump driven by a driving shaft extending through that portion of said body on the side thereof which is remote from said plunger barrel to feed fuel to said pump chamber;

(e) a plunger inserted into said plunger barrel, one end of said plunger cooperating with said plunger barrel to define a fuel pressurizing chamber, the other end of said plunger being coupled to said driving shaft in such a manner that said plunger is rotatable together with said driving shaft in one unit and also reciprocatable axially, said plunger having an outlet slit for providing communication between one of said outlet ports and said fuel pressurizing chamber during the first half of the reciprocating stroke of said plunger, and an inlet slit for providing communication between said feed passage and said fuel pressurizing chamber during the second half of said reciprocating stroke;

(f) a cam mechanism for giving axial reciprocating motion to said plunger, said cam mechanism having a disk cam rotating together with said plunger in one unit, a roller holder assembly having a plurality of rollers supporting said disk cam, and a spring assembly pressing said cam disk;

(g) a timer disposed in the lower part of said body to rotate said roller holder assembly in order to control the fuel injection timing, said timer having a cylindrical timer piston chamber and a timer piston dividing the interior of said timer piston chamber into a high-pressure chamber and a low-pressure chamber, said timer piston being coupled to said roller holder assembly through a pin;

(h) a solenoid-operated timing control valve disposed in the vicinity of said timer to cause said high-pressure chamber and said low-pressure chamber to be communicated with or cut off from each other, thereby controlling the level of pressure inside said high-pressure chamber;

(i) said low-pressure chamber in said timer communicating with a low-pressure hole in said timing control valve through a first passage;

(j) said high-pressure groove in said solenoid-operated timing control valve communicating with said high-pressure chamber through a second passage; and

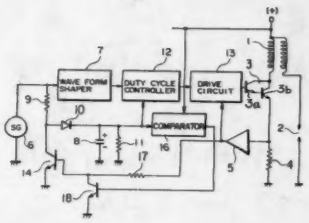
(k) said high-pressure groove and said pump chamber being directly connected together by a third passage through a fixed orifice located in the wall of said body, the junction of said third passage and said high-pressure groove being circumferentially offset from the junction of said second passage and said high-pressure groove.

4,977,883

IGNITION CONTROL APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Mitsuru Koiwa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1990, Ser. No. 495,804
Claims priority, application Japan, Mar. 20, 1989, 1-66070
Int. Cl.[5] F02P 3/05, 3/045
U.S. Cl. 123—644 5 Claims



1. An ignition apparatus for an internal combustion engine comprising:

an ignition coil having a primary winding and a secondary winding;

a first switching member connected in series with the primary winding of the ignition coil;

current sensing means for determining when the current flowing through the primary winding reaches a prescribed level;

a signal generator which generates an alternating current signal is synchrony with the engine;

a capactor which is charged by the signal from the signal generator;

a duty cycle controller connected to the capacitor and the signal generator for generating an output signal which changes from a first level to a second level at a prescribed voltage of the signal generator output signal and which has a duty cycle which is a function of the capacitor voltage;

a drive circuit connected to the duty cycle controller for closing the first switching member while the duty cycle controller has the first level;

a bypass circuit responsive to the current sensing means for preventing the signal generator from charging the capacitor when the current sensing means determines that the primary winding current reaches the prescribed level; and

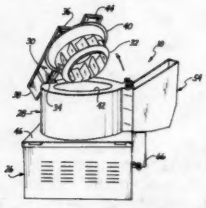
bypass preventing means responsive to the capacitor for preventing the operation of the bypass circuit when the capacitor voltage is below a prescribed level.

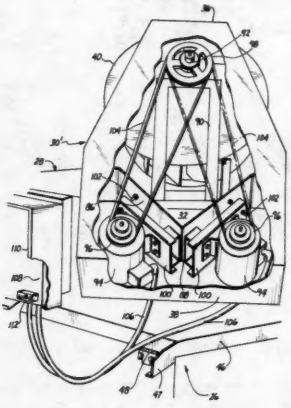
4,977,884

FAIL-SAFE BLOWER DRIVE FOR ROOF MOUNTED KITCHEN HOOD GREASE EXHAUST BLOWERS

Arnold S. Kaufman, Studio City, Calif., assignor to Renco Systems, Inc., Glendale, Calif.

Filed Feb. 5, 1990, Ser. No. 475,246
Int. Cl.[5] F24C *15/20*
U.S. Cl. 126—299 R 10 Claims





1. A roof mountable kitchen grease exhaust blower comprising:

a base for supporting an upper end of an exhaust duct communicating with a ventilation hood for extracting grease laden air over a cooking surface;

a blower housing hinged to said base for movement between a closed operative position and a raised maintenance position;

a discharge scoop fixed to said blower housing;

a blower wheel supported in said housing for exhausting air from said base through said scoop;

said blower wheel supported in a motor housing hinged to said blower housing for movement between a closed operative position and an exposed maintenance position; and

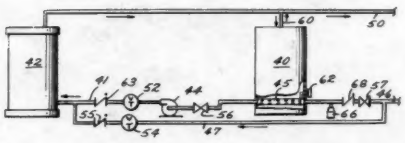
drive means for turning said blower wheel comprising first and second motors mounted to said motor housing, a drive belt equally engageable to one or the other of said motors for driving said blower wheel, and power switch means for selectively powering one of said motors, whereby a backup motor can be readily placed in service for driving said blower in the event of failure of one of said motors.

4,977,885

HOT WATER HEATING SYSTEM WITH SELECTIVE BYPASS

Eleanor B. Herweyer, and Elliott E. Herweyer, both of P.O. Box 257, Goochland, Va. 23063

Continuation-in-part of Ser. No. 377,093, Jul. 10, 1989, abandoned. This application Jan. 17, 1990, Ser. No. 466,600
Int. Cl.[5] F24H *1/00*
U.S. Cl. 126—362 15 Claims



1. A system for supplying water heated to a desired temperature range to a facility having a demand for the heated water varying widely between a normal flow rate and a peak flow rate, comprising:

(a) a water heating means having a capacity for heating unheated water to the desired temperature range at a rate at least equal to the normal flow rate, and having an inlet and an outlet;

(b) unheated water supply means for connection to a source of unheated water;

(c) bypass conduit means connecting said unheated water supply means to said heating means inlet and including a means limiting water flow in said bypass means to a predetermined rate no greater than approximately the capacity for heating of said water heating means;

(d) a storage tank for containing a predetermined volume of water heated approximately to the desired temperature range, and having an inlet and an outlet in the lower portion thereof and a further port in the upper portion thereof, and a means for measuring the temperature of water therein;

(e) supply conduit means connecting said storage tank inlet to said unheated water supply means, and including means for interrupting the flow of water therethrough when the flow of water therein is less than a predetermined value;

(f) transfer conduit means connecting said tank outlet and said heating means inlet, and including means for pumping water from said tank outlet to said heating means inlet, and means for regulating flow therethrough at approximately the capacity for heating of said water heating means;

(g) means activating said pumping means when the temperature measured by said sensor falls below a predetermined temperature;

(h) means interrupting water flow in said bypass conduit means when said pumping means is activated;

(i) means interrupting the flow of water in said transfer conduit means when said pumping means is not activated;

(j) heated water supply means for connection between said heating means outlet and the facility; and

(k) recycle conduit means connected between said heated water supply means and said further tank port.

4,977,886

POSITION CONTROLLING APPARATUS

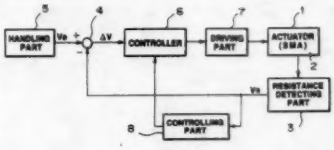
Sakae Takehana; Koji Fujio, both of Hachioji, and Yasuhiro Ueda, Kokubunji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1989, Ser. No. 428,144

Claims priority, application Japan, Apr. 4, 1989, 1-085360; Apr. 19, 1989, 1-099443; Apr. 19, 1989, 1-208845; May 17, 1989, 1-123758; Jun. 4, 1989, 1-087257; Aug. 2, 1989, 1-029284

Int. Cl.[5] A61B *1/00*

U.S. Cl. 128—4 34 Claims



1. A position controlling apparatus comprising:

an actuator having a shape monitoring alloy body as a power source;

a driving means for heating or cooling said shape memorizing alloy body and for displacing said actuator by heating or cooling;

a comparing means for outputting a difference between actual displacement of said actuator driven by said driving means and objective displacement of said actuator and for operating said driving means on the basis of said difference;

a resistance value detecting means for detecting the resistance value of said shape memorizing alloy body varying when said shape memorizing alloy body is heated or cooled; and

a controlling means for inputting the detected resistance value detected by said resistance value detecting means and for controlling said driving means based on said detected resistance value and a preset value of a temperature range of said shape memorizing alloy body.

4,977,887

ENDOSCOPE WITH SCOPE SECTION OF ADJUSTABLE RIGIDITY

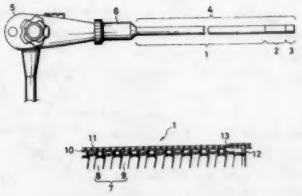
Kazuhiko Gouda, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 24, 1990, Ser. No. 513,977

Claims priority, application Japan, May 2, 1989, 1-113373

Int. Cl.[5] A61B *1/00*

U.S. Cl. 128—4 12 Claims



1. An endoscope equipped with a scope section to be inserted into a body cavity of a patient, the scope section comprising:

an end portion having an imaging device;

a middle portion connected to the end portion, comprising:

a composite helical tube formed by outer and inner helical tubes of different winding radii which are wound coaxially; and

an outer covering wrapped around the composite helical tube; and

means for controlling a rigidity of the middle portion by changing a winding radius of the inner helical tube while the outer helical tube is immovably fixed.

4,977,888

LIQUID CIRCULATION SYSTEM FOR AN APPARATUS FOR DISINTEGRATING CALCULI IN THE BODY OF A LIFE FORM AND METHOD OF OPERATION

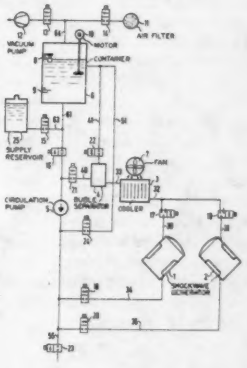
Josef Rietter, Moehrendorf; Istvan Tyukodi, Nuremberg, and Reinhard Schindler, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 110,834, Oct. 21, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 434,506

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1986, 3636289

Int. Cl.[5] A61B *17/22*

U.S. Cl. 128—24 A 14 Claims



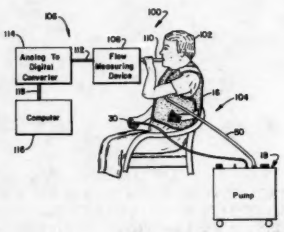
1. In an apparatus for disintegrating calculi in the body of a life form, said apparatus comprising a shockwave generator having a chamber filled with a liquid coupling agent, and a liquid circulation system which is connected to the chamber and has a container and a circulation pump, the improvements comprising the liquid circulation system being formed by a small circulating portion for circulating a liquid through the chamber and a second circulation portion for a degassification operation, said small circulation portion connected to the chamber of the shockwave generator including the circulation pump, first and second lines extending between said chamber and circulation pump, and a cooler and a bubble separator being positioned on one of said first and second lines, said second circulation portion including the container, said system including liquid connecting lines extending between the container and said small circulation portion and said system having valves for controlling flow in the liquid connecting lines extending between the second circulation portion and the small circulation portion to enable control of the flow of liquids between the second and small portions.

4,977,889

FITTING AND TUNING CHEST COMPRESSION DEVICE

Jeffrey R. Budd, St. Paul, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Oct. 12, 1989, Ser. No. 420,276
Int. Cl.[5] A61H 31/02
U.S. Cl. 128—30.2 9 Claims



1. Apparatus for optimizing fit and frequency of device which provides alternating compression to thoracic cavity of a person for purpose of enhancing respiration, said device including means for compressing said person's thoracic cavity, said compressing means being adjustable with respect to the thoracic cavity, said apparatus comprising:

means for measuring actual air flow from said person during respiration while said alternating compression device is operating;

means for computing from said measured actual air flow the parameters of normal air flow of said person as if said alternating compression device were not operating, normal lung volume of said person as if said alternating compression device were not operating, induced air flow peaks relative to said normal air flow and due to said alternating compression device operating, average of said induced air flow peaks, and average of induced changes in lung volume relative to said normal lung volume and due to said alternating compression device operating; and

means for converting said measured actual air flow to an electrical signal compatible with said computing means;

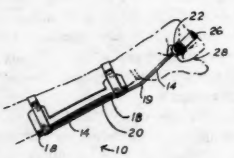
wherein the fit is optimized when said induced air flow peaks are substantially the same relative to normal lung volume during respiration and optimal frequencies occur when average induced air flow peaks and average induced lung volume changes are greatest.

4,977,890

HAND SPLINT

Donaerl B. Mann, St. Petersburg, Fla., assignor to Interstate Medical Marketing, Inc., Clearwater, Fla.

Filed Nov. 17, 1989, Ser. No. 438,770
Int. Cl.[5] A61F 5/10, 5/04
U.S. Cl. 128—77 16 Claims



1. A device for controlling wrist and hand deformities comprising, a bendable rod having a hook or loop material fixed to at least one longitudinal surface,

a forearm support member attached to a top surface of a rear portion of the bendable rod,

a pair of hook or loop straps binding the bendable rod and forearm support member to the forearm of a patient,

the bendable rod being bent at a range of fifteen degrees upwardly to forty five degrees downwardly measured from a straight line extending along the rod from a pivot point adjacent a forward portion of the forearm support member,

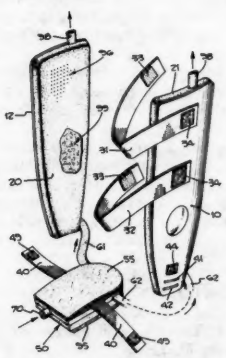
a removable palmar member attached to a front portion of the bendable rod distal from the forearm support member and a hook or loop material attached at a first and second end of the palmar member so that fingers of the patient's hand are closely secured to the palmar member when the hooks or loops at one end are attached snugly to the hooks or loops at the second end.

4,977,891

VARIABLE SUPPORT ANKLE BRACE

Tracy E. Grim, Broken Arrow, Okla., assignor to Royce Medical Company, Westlake Village, Calif.

Filed Nov. 8, 1989, Ser. No. 433,565
Int. Cl.[5] A61F 5/00
U.S. Cl. 128—80 H 18 Claims



1. An ankle brace for insertion into a shoe comprising:

a pair of side supports for fitting about the lower leg on both sides and with the side supports having a configuration to support both sides of the ankle;

inflatable bladders mounted on said side supports to provide a cushion between the ankle and the side supports, and for applying supporting pressure;

means for securing the side supports to firmly encase the ankle;

flexible means for extending between the side supports toward the bottom of said supports;

means including a pump secured to said flexible means and actuated by walking or running activity for supplying air to said inflatable bladders; and

a one way valve interconnecting said pump and said bladders;

whereby walking or running activity increases the air pressure in said inflatable bladders and provides additional support to the foot and ankle against inversion, eversion or anterior subluxation while permitting plantarflexion and dorsiflexion.

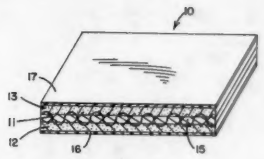
4,977,892
WOUND DRESSING WITH HYDROPHILIC ABSORBENT LAYER

Ralph X. Ewall, Chagrin Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 89,204, Aug. 25, 1987, abandoned, which is a continuation-in-part of Ser. No. 899,575, Aug. 25, 1986, abandoned. This application Oct. 3, 1989, Ser. No. 430,903

Int. Cl.[5] **A61F** *13/00, 15/00;* **A61L** *15/00*

U.S. Cl. 128—156 **36 Claims**



1. An occlusive wound dressing capable of retention of wound exudate which comprises a laminate having the following layers:

(a) an adhesive layer capable of permitting passage of liquid therethrough, said adhesive layer upon pressure contact with the skin of a patient permitting prolonged adhesion of said wound dressing to said skin without adhering to the wound;

(b) a fabric layer having a fabric and protruding fibers being bonded to said adhesive layer which retains structural integrity upon exposure of said wound dressing to said wound exudate;

(c) a hydrophilic absorbent polymeric layer comprising hydrophilic absorbent polymeric material which is deposited substantially within the fabric, said hydrophilic absorbent polymeric layer being impregnated substantially within the fabric, the resultant fabric having structural integrity to remain bonded to said adhesive layer upon exposure of said wound dressing to said wound exudate, said hydrophilic absorbent polymer layer capable of absorbing the liquid drawn into said wound dressing from said wound exudate when said wound dressing is placed over the wound of a patient; and

(d) at least one occlusive backing layer selected from the group consisting of a film, foam, foam-like laminate and fabric, said backing layer being attached to protruding fibers of said fabric through a second adjacent adhesive layer.

4,977,893
SURGICAL HIP WRAP

James R. Hunt, Carencro, La., assignor to Surgical Specialties, Inc., Lafayette, La.

Filed Jul. 17, 1989, Ser. No. 380,605

Int. Cl.[5] **A61F** *13/00*

U.S. Cl. 128—157 **7 Claims**

1. An elongated fabric strip configured to independently wrap around the waist and one upper thigh of a user, thereby covering and protecting a hip region, said one upper thigh of said user being the thigh adjacent the hip to be covered and protected by said fabric strip, said strip comprising:

(a) first securing means for securing a first end region of said fabric strip around the waist of said user, said first securing means comprising two or more elongated planar extensions, separately by a gap, each configured to wrap around the waist region of said user;

(b) second securing means for securing a second end region of said fabric strip around said one upper thigh of said user, thereby positioning an intermediate region of said fabric strip against a hip region of said user, said second securing means comprising an elongated extension configured to wrap around said upper thigh of said user;

(c) said elongated extensions of said first and second securing means projecting outwardly in opposite directions away from said intermediate region, said intermediate region being wider than either of said extension, said extensions of said first and second securing means being not co-linear and offset one from the other, but extending along generally parallel lines; and

(d) a notch adjacent said second securing means and projecting concavely into said intermediate region, said notch being configured to accommodate the crotch region of a user when said fabric strip is used.

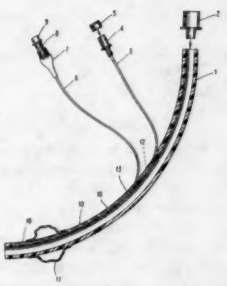
4,977,894
LARYNGO-TRACHEAL ANALGESIA ENDOTRACHEAL TUBE

Gerald G. Davies, Iowa City, Iowa, assignor to Sheridan Catheter Corporation, Argyle, N.Y.

Continuation of Ser. No. 31,877, Mar. 30, 1987, abandoned. This application Apr. 7, 1989, Ser. No. 334,435

Int. Cl.[5] **A61M** *16/00*

U.S. Cl. 128—207.15 **2 Claims**



1. An endotracheal tube capable of administering a local anesthetic comprising:

(a) a tubular member for ventilating a patient, said tubular member having an arcuate shape, an interior, a proximal end and a distal end;

(b) a first conduit associated with the tubular member for carrying a local anesthetic, said first conduit sealed from fluid communication with the interior of said tubular member;

(c) first aperture means extending along a portion of the length of the tubular member and in fluid communication with the first conduit for permitting local anesthetic to be sprayed radially inwardly of the arcuate shape along the larynx, trachea and epiglottis of a patient when the endotracheal tube is in its operable position, said first aperture means comprising a plurality of apertures extending longitudinally along a portion of the length of the tubular

member said first aperture means being sealed from fluid communication with the interior of said tubular member;

(d) inflatable means connected to the tubular member and located in the vicinity of the distal end for providing an air-tight seal of the trachea, said inflatable means comprising an inflatable cuff and said first aperture means being positioned between the inflatable cuff and the proximal end of the tubular member;

(e) second aperture means in fluid communication with the first conduit, said second aperture means being located between the distal end of the tubular member and the inflatable means for permitting local anesthetic to be sprayed inwardly of the arcuate shape along the trachea of the patient, said second aperture means being sealed from fluid communication with the interior of said tubular member; and

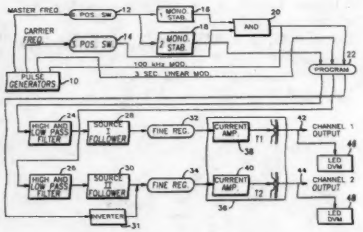
(f) a second conduit associated with the tubular member and in fluid communication with the interior of the inflatable means.

4,977,895

ELECTRICAL APPARATUS FOR MEDICAL TREATMENT

Joseph Tannenbaum, Jerusalem, Israel, assignor to Ely Shavit Pasternak, Holon, Israel, a part interest

Filed May 22, 1989, Ser. No. 354,766
Int. Cl.[5] A61N 1/00
U.S. Cl. 128—421 15 Claims



1. An electrical neuro-stimulation apparatus comprising:

first pulse generation means for providing a first variable frequency and pulse width output;

second pulse generation means for providing a second variable frequency and pulse width output;

switching means for providing a series of successive pulse trains as a combination of said first and second pulse width outputs on at least one output channel, wherein for each of said series of successive pulse trains, the period of said pulse train duration and the interval between it and the next successive pulse train are substantially equivalent, and random pulses appear in said series of successive pulse trains in accordance with digital mixing of the output of said first and second pulse generation means;

means for modulating said series of successive pulse trains so as to provide a pulse waveform envelope having an increasing amplitude during a predetermined interval; and

current amplification means for providing said modulated series of successive pulse trains to at least one pair of electrodes with substantially constant current in relation to behavioral changes in tissue impedance for increased penetration, said amplified modulated series of pulse trains adapted to provide electrical stimulation of the large myelinated nerves, said stimulation having associated therewith the characteristics of significantly increased energy and relatively low skin irritation and pain levels.

4,977,896

ANALYSIS OF BIOLOGICAL SIGNALS USING DATA FROM ARRAYS OF SENSORS

Stephen E. Robinson, San Diego, and William C. Black, Jr., Del Mar, both of Calif., assignors to Biomagnetic Technologies, Inc., San Diego, Calif.

Filed May 26, 1989, Ser. No. 359,640
Int. Cl.[5] A61B 5/05
U.S. Cl. 128—653 R 14 Claims

1. A process for sensing and evaluating signals emanating from the brain of a subject, comprising the steps of:

providing an array of magnetic field sensors disposed external to a head of said subject at known locations;

measuring a signal strength detected by each of said sensors;

multiplying the signal strength measured by each of said sensors times a weighting coefficient for that sensor selected to focus the sensitivity of the array of said field sensors on a selected location in the brain, to determine a virtual sensor contribution for each of said sensors; and

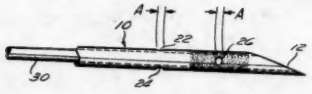
adding together the virtual sensor contribution of each of said sensors, to define a virtual sensor signal.

4,977,897

AMNIOCENTESIS NEEDLE WITH IMPROVED SONOGRAPHIC VISIBILITY

Robert Hurwitz, 2310 Tustin Ave., Newport Beach, Calif. 92660

Filed Aug. 17, 1988, Ser. No. 233,073
Int. Cl.[5] A61B 8/14
U.S. Cl. 128—662.05 22 Claims



1. A cannula for use in medical procedures wherein ultrasonic imaging of the cannula is achieved by directing an incident ultrasonic beam of known wavelength against the cannula, said cannula comprising:

a generally tubular cannula body having a proximal end, a distal end, a generally cylindrical wall, and a hollow inner lumen extending axially therethrough;

at least one generally round sounding aperture formed in said cannula wall, the diameter of said sounding aperture being approximately equal to the known wavelength of said incident ultrasonic beam.

4,977,898

MINIATURIZED ENCAPSULATED ULTRASONIC TRANSDUCER

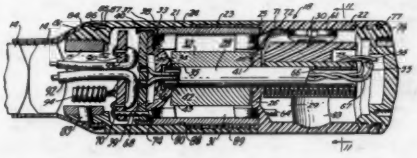
Jack Schwarzschild, Stamford; Russel L. Uphoff, West Redding, and Christopher G. Miller, Norwalk, all of Conn., assignors to Hoffrel Instruments, Inc., South Norwalk, Conn.

Continuation of Ser. No. 160,359, Feb. 25, 1988, Pat. No. 4,834,102. This application May 30, 1989, Ser. No. 358,667

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.[5] A61B 8/12

U.S. Cl. 128—662.06 16 Claims



1. An ultrasonic sector scanner, which comprises

(a) a housing capsule including an elongated tubular housing section and spaced end walls forming a sealed enclosure,

(b) a tubular shaft mounted axially within said housing and supported therein for limited rotation through an angle of less than 360°,

(c) a rotor magnet fixed to one axial portion of said shaft and rotatable therewith,

(d) an ultrasonic transducer unit fixed to a second axial portion of said shaft and rotatable therewith, and

(e) flexible conductor means extending through said tubular shaft and connected at one end to said transducer unit for activating the same,

(f) one of said housing end walls having terminal conductors passing therethrough in sealed relation,

(g) said flexible conductor means being connected at their other ends to said terminal conductors.

4,977,899

HEART DATA MONITORING METHOD AND APPARATUS

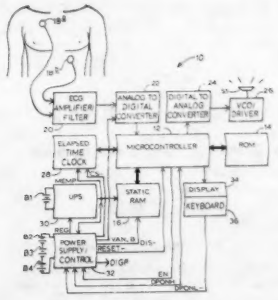
Dennis Digby, Wilsonville, and Habib Homayoun, Aloha, both of Oreg., assignors to Instromedix, Inc., Hillsboro, Oreg.

Division of Ser. No. 321,736, Mar. 10, 1989, Pat. No. 4,958,641.

This application Nov. 24, 1989, Ser. No. 440,711

Int. Cl.[5] A61B 5/04

U.S. Cl. 128—702 11 Claims



1. For use in ambulatory cardiac patent care, portable ECG monitoring apparatus comprising:

detection means for detecting an abnormality in a patient's cardiovascular performance definable as an event;

event determination means integral with said detection means and responsive thereto for determining that an event has occurred;

recordation means integral with said determination means for recording such event as ECG data representative thereof and interpretable by a physician, said recordation means including at least one volatile memory device in which such ECG data are stored; and

power supply means supplying power to circuitry including said detection means, said event determination means, and said recordation means, said power supply means including at least a first and a second power source which are independently operable, said first power source normally supplying power at least a first predetermined voltage level to a portion of said circuitry including said detection means, said event determination means, and said recordation means, said second power source supplying power at a second predetermined voltage level to a smaller portion of said circuitry including said recordation means when said first power source fails to supply at least said first predetermined voltage level, whereby such event recorded as ECG data within said memory device is preserved.

4,977,900

MICROSURGICAL FORCEPS WITH CLEANING FLUID PASSAGE

Guido Fehling, Frankenstrasse 21, 8757 Karlstein, and Gunter Stoffel, Kantstrasse 35, 7204 Wurmlingen, both of Fed. Rep. of Germany

Filed Dec. 21, 1988, Ser. No. 287,223

Claims priority, application Fed. Rep. of Germany, Jan. 8, 1988, 3800331

Int. Cl.[5] A61B 10/00

U.S. Cl. 128—751 8 Claims

1. Microsurgical forceps comprising first and second pincer jaws connected to a tube and to a shaft reciprocable in said tube:

first and second hand engageable elements connected for relative movement,

said tube extending from one said element and connected to said first jaw,

means for securing said tube to said first element,

said shaft being in said tube and of lesser diameter than the internal diameter of said tube to provide a space therebetween, said shaft connected to said second jaw and having a proximal end in said one element, and

means for connecting said shaft to said second element for movement therewith, comprising a hollow rod having a distal end, and means for connecting said hollow rod distal end to the proximal end of said shaft substantially coaxially therewith and for providing a fluid connection between the hollow of said rod and said space between said shaft and said tube,

whereby a fluid cleaning agent may be introduced into said space through said hollow rod.

4,977,901

ARTICLE HAVING NON-CROSSLINKED CRYSTALLIZED POLYMER COATINGS

Ronald F. Ofstead, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 275,767, Nov. 23, 1988, abandoned. This application Apr. 6, 1990, Ser. No. 505,411

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—772 13 Claims

1. An article that comes into contact with bodily fluids wherein being slippery when wet is a desirable property of the article, which article is coated by a non-crosslinked, crystallized polymer or polymer blend comprising poly(vinyl alcohol) wherein said polymer or polymer blend is soluble before crystallization in water or DMSO at temperatures less than about 100° C., and is stable in the presence of water at temperatures of up to about 60° C.

4,977,902

SUPERSONIC HYPERTHERMIA TREATING METHOD

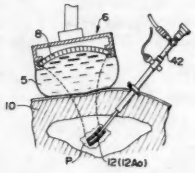
Naomi Sekino; Shuichi Takayama; Takashi Tsukaya, all of Hachioji; Masakazu Gotanda, Kanagawa; Tetsumaru Kubota, Hachioji; Naoki Uchiyama, Hachioji; Koichiro Ishihara, Hachioji; Kuniaki Kami, Hachioji; Akira Murata, Hachioji, and Masaaki Hayashi, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed May 8, 1989, Ser. No. 348,814

Claims priority, application Japan, Jul. 15, 1988, 63-176323

Int. Cl.[5] A61N *1/06*

U.S. Cl. 128—804 29 Claims



1. A supersonic hyperthermia treating method comprising the steps of;

inserting a heat generating member having a high attenuation for supersonic waves into a part to be treated in a body;

leaving the heat generating member in the part; and

transmitting supersonic waves from the outside of the body to the heat generating member by means of a supersonic wave generator which generates supersonic waves to cause the heat generating member to heat the part to be treated.

4,977,903

SENSORY TRANSMITTING MEMBRANE DEVICE

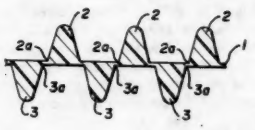
Bernard M. Haines, Glenwood Springs, Colo., assignor to Jerome F. Schweich, San Francisco, Calif.

Continuation-in-part of Ser. No. 409,402, Sep. 19, 1989, abandoned. This application Apr. 13, 1990, Ser. No. 509,258

Int. Cl.[5] A61F *6/02, 6/04*

U.S. Cl. 128—842 16 Claims

1. A device for the transmission of information between surfaces comprising a substantially homogenous elastomeric material base membrane having first and second sides and a plurality of first and second projections spaced apart and integrally formed with said base membrane, the first projections extending from the first side and the second projections extending from the second side 180° from the first projections, the projections being positioned so that an edge of the base of a first projection is in proximity to the opposite edge of the base of a second projection, whereby a force imparting a linear motion to a first projection in a direction parallel to the base



membrane results in a similar motion by any cooperating second projections.

4,977,904

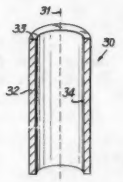
ARTICLES FOR THE PROTECTION OF LIVING TISSUE

Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11556

Continuation-in-part of Ser. No. 887,262, Jul. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 852,797, Apr. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 602,602, Apr. 20, 1984, Pat. No. 4,601,286. This application Sep. 2, 1987, Ser. No. 92,133

Int. Cl.[5] A61B *19/08, 19/12*

U.S. Cl. 128—856 21 Claims



1. A method for effecting surgery and therapy on humans and animals with lasers without undesired exposure of said humans, animals and other articles to stray laser beams, comprising the steps of

(a) inserting a tubular article comprising at least one layer comprising a xerogel comprising at least one hydrophilic water-insoluble polymer, into the body cavity, of said human or animal, wherein said surgery or treatment is to be effected;

(b) applying said laser to the desired site; and

(c) as necessary, adding to said xerogel layer water or an aqueous solution of additive, if any, to replace water lost from said layer during said surgery or treatment; wherein said tubular element may, as desired, be hydrated before or after insertion.

4,977,905

PROTECTIVE MOUTHGUARD ASSEMBLY

Jon D. Kittelsen, 1221 W. County Rd. B, Roseville, Minn. 55113, and Timothy J. Thomas, 4347 45th Ave. South, Minneapolis, Minn. 55406

Filed Oct. 31, 1989, Ser. No. 429,841

Int. Cl.[5] A61F *5/14*

U.S. Cl. 128—861 23 Claims

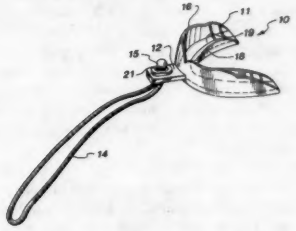
1. A protective, tethered mouthguard assembly comprising:

a mouthpiece portion for insertion into the user's mouth and protective engagement with the user's teeth;

a connecting tab connected directly to said mouthpiece portion and having a first tether attachment means therein; and

a breakaway tether separate from said mouthpiece portion and connecting tab, said tether having a second tether attachment means that is separate from said mouthpiece

and attachable to said first tether attachment means for selectively attaching said tether to, and detaching said



tether from, said connecting tab and for facilitating the breakaway feature of said tether.

4,977,906

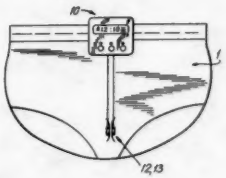
DIURNAL REHABILITATION FOR INCONTINENCE TRAINER

William J. Di Scipio, 64 Grove Ave., Larchmont, N.Y. 10538

Filed Mar. 7, 1989, Ser. No. 320,135

Int. Cl.[5] A61F *5/48;* G08B *21/00*

U.S. Cl. 128—885 19 Claims



1. A self-contained, portable apparatus for use in a diagnostic and biofeedback study and treatment of urinary incontinence, comprising:

an undergarment to be worn by the patient to be treated;

means positioned upon said undergarment for detecting the presence of urine therein;

a monitoring device comprising a time keeping component;

a component operatively associated with said time keeping component for recording the time of each detection of the presence of urine by said detecting means;

a power source component;

means for electrically interconnecting said detecting means and said monitoring device components; and

means for attaching said monitoring device to said undergarment; wherein the monitoring device further comprises means for generating a signal to apprise the patient of each detection of the presence of urine by the detecting means, said signal generating means electrically connected to and operatively associated with said monitoring device components and said detecting means, wherein said signal includes a vibratory mode, and auditory mode and a combination vibratory/auditory mode.

4,977,907

TOBACCO BLOCK SLICING MACHINE

Eric T. Ray, Salisbury, and Peter A. Vigg, Andover, both of England, assignors to GBE International PLC, Andover, England

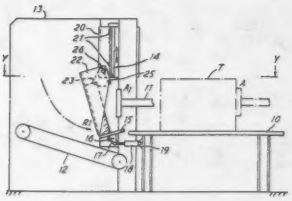
PCT No. PCT/GB86/00700, § 371 Date Jul. 2, 1987, § 102(e) Date Jul. 2, 1987, PCT Pub. No. WO87/02868, PCT Pub. Date May 21, 1987

PCT Filed Nov. 12, 1986, Ser. No. 83,789

Claims priority, application United Kingdom, Nov. 13, 1985, 8528002

Int. Cl.[5] A24B *3/07, 3/18*

U.S. Cl. 131—290 6 Claims



6. A method of slicing a block of material comprising

a. supporting said block on a support surface,

b. pushing said block to a first position by pusher means,

c. effecting a first slicing operation in a downward direction to produce a slice standing on its narrow edge,

d. pushing said block by continued advancing movement of said pusher means to a second position whilst simultaneously pushing the first slice of the block off the support surface,

e. effecting successive slicing and pushing off of the resulting slices until the last slicing operation for that block has taken place,

f. retaining the last slice of the block in position on its narrow edge,

g. withdrawing the pusher means, and

h. releasing said last slice after said pusher means has commenced its return movement.

4,977,908

TOBACCO RECONSTITUTION

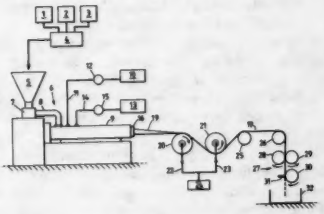
John A. Luke, Eastleigh, England, assignor to British-American Tobacco Company

Filed Feb. 22, 1988, Ser. No. 158,512

Claims priority, application United Kingdom, Feb. 23, 1987, 8704196

Int. Cl.[5] A24B *3/14*

U.S. Cl. 131—375 17 Claims



1. A tobacco reconstitution process, wherein a mixture of particulate tobacco, starch and binders, of which mixture starch constitutes 5% to 35% by weight, binder constitutes up

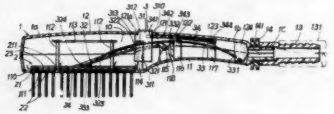
to 10% by weight and the amount of starch is, by weight, twice or more the amount of binder, with the addition of water, is extruded in an extruder comprising a die provided with an exit orifice, to provide a sheet form extrudate comprising a cellular interior structure, under such conditions that water in said extruder is in the liquid phase and immediately upon issuing from said die the water flashes off to steam causing the extrudate to expand and assume a cross-section greater than that of said exit orifice, and the extrudate is cut to provide a product of tobacco-filler size particles.

4,977,909

PUSH-BUTTON TYPE RETRACTABLE BRUSH

Fa:go Chou, P.O. Box 10160, Taipei, Taiwan

Filed Nov. 1, 1989, Ser. No. 429,974
Int. Cl.[5] A45D *24/10*
U.S. Cl. 132—123 **1 Claim**



1. A push-button type retractable brush comprising:

a casing having a hollow chamber defined between a lower cover drilled with a plurality of bristle holes therein and an upper cover, a front brush body, a handle portion adjacent to said brush body and a rear tube secured to said handle portion and connected with a water hose for directing water into said hollow chamber of said casing;

a bristle means having a bristle base slidably held in said casing, and a plurality of bristles formed in said base operatively extendible through said bristle holes for brushing and combing use, said bristle base having a plurality of water holes formed therein, said lower cover including a plurality of bristle-extending guides slidably engageable with a plurality of guide holes formed in said bristle base, and at least a limiting plate formed on an upper end of each said guide to limit an upward movement of said bristle base; and

a bristle extender including a push button normally protruding above said upper cover of said casing, a biasing lever pivotally secured in said casing operatively depressible by said push button for depressing said bristle base downwardly, a restoring spring secured between said casing and said bristle base for normally restoring said bristle means upwardly to retract said bristles in said casing, and a button-retaining spring secured in said casing normally urging said push button frontwardly to be operatively locked under said upper cover when depressing said push button,

the improvement which comprises:

said push button including a button block slidably held in a button hole formed in said upper cover, a bottom socket formed in a bottom of said block held in a tapered button stem formed on said lower cover, a horizontal bar transversely formed on said block for operatively depressing said biasing lever, and a recessed hook portion on an upper front portion of said block operatively engaged with a front edge of said button hole for locking said button under said upper cover when depressing said push button;

said biasing lever including a rear pivot pivotally secured on a lever bracket formed in said casing, a button slot formed in a middle shoulder portion of said lever for free passing said button therethrough, and a front depressing plate formed on a front end portion of said lever having a bottom groove slidably engageable with a reinforced guiding extension formed on said bristle base, said shoulder portion being operatively depressed by a horizontal bar of said push button to allow said front depressing plate to depress said bristle base downwardly for extending said bristles;

said button-retaining spring including: a pushing plate formed on a front portion of said button-retaining spring having a bifurcate arm portion circumferentially disposed around said button block for normally sealing said button hole of said upper cover, a longitudinal slot formed in a middle portion of said button-retaining spring reciprocatively held in a first spring stem formed in said casing, and a rear end thereof secured to a second spring stem formed in said casing; and

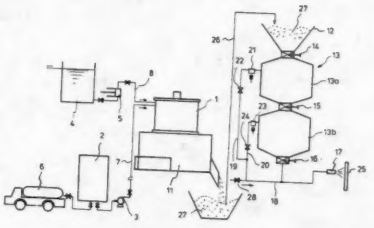
said restoring spring including a rear end secured in said casing, a fulcrum portion formed on a middle portion of said restoring spring secured on a fulcrum holder formed in said casing, and two bifurcate front ends of said restoring spring secured to said bristle base, said restoring spring normally restoring said bristle base upwardly to retract said bristles in said casing, whereby upon a depression of said push button, said biasing lever will be forced to depress said bristle base so as to extend said bristles outwardly beyond the lower cover for combing and brushing hairs.

4,977,910

CLEANING METHOD FOR APPARATUS

Shuji Miyahara; Harumi Kimuro, both of Yokohama, and Saburo Yamashita, Ayase, all of Japan, assignors to Shikawajima-Harima Jukogyo Kabushi Kaisha, Japan

Filed Sep. 17, 1984, Ser. No. 651,267
Claims priority, application Japan, Sep. 19, 1983, 58-172732
Int. Cl.[5] B01B *7/00*
U.S. Cl. 134—7 **2 Claims**



1. A method of cleaning the surface of an object comprising,

subjecting liquified carbon dioxide to adiabatic expansion to produce snow-like dry ice particles;

simultaneously spraying water into said dry ice particles as they are produced to form a mixture of snow-like dry ice and snow-like frozen water particles;

pelletizing said mixture by compression to form hard composite abrasive particles thereof; and

projecting in a fluid medium the pelletized particles so produced against an object to be cleaned.

2. A cleaning apparatus comprising a chamber for producing a mixture of snow-like dry ice and snow-like frozen water;

means for atomizing liquified carbon dioxide within said chamber;

means for spraying water into said chamber below said atomizing means;

a compression pelletizer for receiving and compressing the mixture produced in said chamber into hard composite abrasive particles of dry ice and frozen water; and

means for projecting said pelletized particles against an object to be cleaned.

4,977,911

PROCESS AND DEVICE FOR CLEANING A SPRAYER

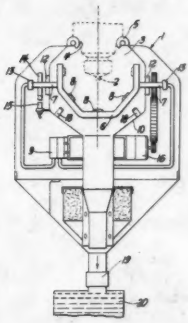
Kurt Vetter, Remseck; Michael Baumann, Flein, and Thomas Hezel, Ingersheim, all of Fed. Rep. of Germany, assignors to Behr Industrieanlangen GmbH & Co., Bietigheim-Bissingen, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,564

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808801

Int. Cl.[5] B08B *3/02*

U.S. Cl. 134—34 9 Claims



1. A method of cleaning coating material from the exterior surface of a sprayer deposited during a spray coating operation, comprising the steps of;

inserting the exterior surface of the sprayer to be cleaned into a cleaning chamber while maintaining a portion of the sprayer outside of the cleaning chamber;

perfecting a fluid-tight seal between the sprayer and the cleaning chamber;

spraying a cleaning medium at the exterior surface from an array of nozzles; and

including the step of (oscillating) moving the array of nozzles in two directions in a path around the exterior surface while spraying the cleaning medium.

4,977,912

FINELY PULVERIZED COMPONENT ADDED IN VEHICLE SPRAY WASHING WATER AND APPARATUS FOR RECOVERING THEREOF

Hiroshi Matsumura; Yasato Oota; Tadashi Matsumura, and Takayuki Abe, all of Tokyo, Japan, assignors to Tokyo Tatsuno Co., Ltd., Tokyo, Japan

Division of Ser. No. 308,082, Feb. 9, 1989. This application May 4, 1989, Ser. No. 347,120

Claims priority, application Japan, Feb. 29, 1988, 63-44290; Jun. 7, 1988, 63-138462

Int. Cl.[5] B08B *3/02*

U.S. Cl. 134—104.4 3 Claims

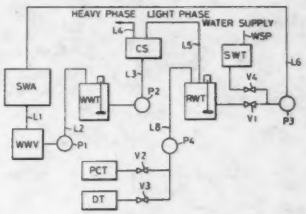
1. A vehicle spray washing system comprising,

a finely pulverized component added in vehicle spray washing water which may contain a detergent, in which said component has a Mohs hardness of approximately 1, a specific gravity of less than 1 and a particle dimension of 5-30 m,

a first waste water vessel for temporally storing waste washing water and causing heavy dirt and mud in the water to sediment,

a second waste water vessel for storing the waste water fed from the first vessel, the second vessel being provided with an impeller stirrer for stirring the waste water so as to prevent the pulverized component from swimming,

a centrifugal separator having a centrifugal force in the range of approximately 6,000 G to 15,000 G, said centrifugal separator separating the waste water fed from the second vessel into sludge collected by said separator, a heavy phase mainly containing clarified water to be discharged in a sewer and light phase water mainly containing the pulverized component to be reused, and



a regenerated washing water tank for storing the light phase water which is fed to a spray washing apparatus by a high pressure pump, the tank being provided with an impeller stirrer for stirring the water.

4,977,913

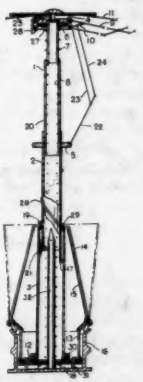
AUTOMATIC UMBRELLA

Usher Meyman, 230 Ocean Pkwy., #E3, Brooklyn, N.Y. 11218

Filed Apr. 17, 1989, Ser. No. 339,587

Int. Cl.[5] A45B *25/16*

U.S. Cl. 135—24 3 Claims



1. An automatic umbrella comprising

a telescopic stick comprising an upper tube, at least one middle tube, and a lower tube;

at least two rings, one of said rings is fixed to said upper tube, and other of said rings is slidably mounted on said upper tube;

a canopy;

a frame supporting said canopy and having main ribs pivotably connected to said fixed ring and main stretchers pivotably connected to said sliding ring;

means for automatic closing and opening said frame;

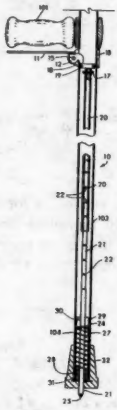
a case for the closed umbrella provided on said lower tube; and

means for twisting the folds of the canopy which appear during closing the frame by spirally moving said middle and lower tubes relative to one another.

4,977,914
SLIP RESISTENT APPARATUS FOR CANES, CRUTCHES AND WALKERS

Charles W. Smerker, 3833 Vigilante Dr., Great Falls, Mont. 59405

Filed Jul. 20, 1989, Ser. No. 382,217
Int. Cl.[5] A45B 9/04
U.S. Cl. 135—81 5 Claims



1. A slip resistant apparatus for walking aids of the type having a hollow tubular leg with an upper end and a lower end, the apparatus comprising:

a user handle located adjacent the upper end of the hollow tubular leg;

an elongate tube having an upper end and a lower end and positioned within the hollow tubular leg, the elongate tube further having a transverse slot extending through a wall of the tube and positioned adjacent the lower end of the elongate tube;

an elongate rigid rod having an upper end and a lower end with the upper end slidably received inside the elongate tube, the elongate rigid rod further having a plurality of indentations positioned along the longitudinal extent of the rod;

a spike tip integrally formed at the lower end of the elongate rigid rod;

a lever member pivotally attached intermediate its ends to the tubular leg adjacent the upper end of the tubular leg and having a first end positioned adjacent the handle and a second end operably abutting the upper end of said elongate tube, whereby when a user pivots the first end of the lever member toward the handle, the second end of the lever member pushes the elongate tube in a downward direction;

a spring biasing means connected between said hollow tubular leg and said elongate rigid rod for biasing said rod toward a normal rest position within the tubular leg;

a lower tubular extension telescopically received at the lower end of said tubular leg;

means for locking the tubular extension at a selected position within the tubular leg;

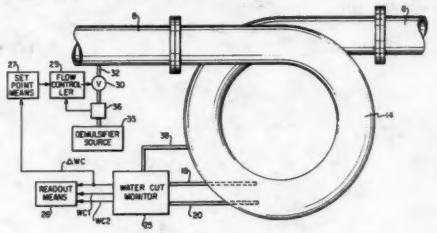
a foot tip removably mounted on a lower end of said tubular extension, said foot tip having an aperture sized and shaped to receive the elongate rigid rod;

means for selectively attaching the elongate rigid rod to the elongate tube at a position where the spike tip of the elongate rigid rod extends through the aperture of the foot tip when the first end of the lever is pivoted toward the handle and is retracted to the normal rest position within the tubular leg when the first end of the lever is released.

4,977,915
DEMULSIFIER CONTROL SYSTEM AND METHOD

John D. Marrelli, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Nov. 8, 1989, Ser. No. 433,104
Int. Cl.[5] G01N 33/26; B01D 17/05
U.S. Cl. 137—4 17 Claims



13. A method for controlling the addition of a demulsifier to a petroleum stream comprising the steps of:

affecting the petroleum stream to establish a density gradient,

sampling the petroleum stream at different points along the density gradient to provide two sample streams,

determining the watercut of each sample stream,

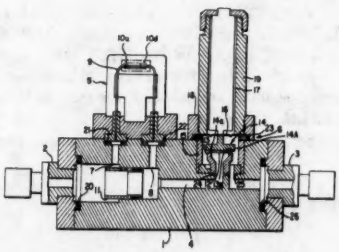
providing at least one output signal corresponding to the determined watercuts, and

providing the demulsifier from a source to the petroleum stream 2-upstream of the affecting of the petroleum stream in response to the output signal.

4,977,916
MASS FLOW CONTROLLER

Tadahiro Ohmi, Sendai; Hiroshi Mihara, Kyoto, and Kiyoshi Satoh, Mukoh, all of Japan, assignors to Stec Inc., Kyoto, Japan

Filed Jun. 15, 1989, Ser. No. 366,681
Claims priority, application Japan, Jun. 20, 1988, 63-152673
Int. Cl.[5] G05D 7/00
U.S. Cl. 137—8 7 Claims



7. In a method of controlling the supply of gases in the production of semiconductor elements to prevent the contamination of moisture with a mass flow controller having a mass flow meter and a gas-controlling portion with a valve assembly of an enlarged annular rimmed valve port of a mirror finish surface having a maximum surface roughness height of 0.5 microns and a valve head, also of a mirror finish surface, having a maximum surface roughness height of 0.5 microns, the gas-controlling portion connected to a source of purging gas such as N_2 or Ar gas, the improvement comprising:

increasing the flow rate of a nitrogen purging gas through the valve assembly to 5 liters/minute for several days to provide a new point of −100° C., and

subsequently precisely controlling the flow of argon

through the same valve assembly at less than 100 cc/minute to enable sputtering for semiconductor production.

4,977,917

MODULAR DIFFERENTIAL PRESSURE TRANSMITTER/MANIFOLD FOR A FLUID CONVEYING PIPELINE

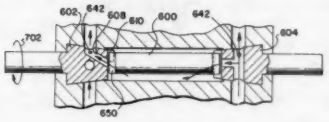
Don L. Adams, P.O. Box T, Tulia, Tex. 79088

Continuation-in-part of Ser. No. 183,009, Apr. 18, 1988, Pat. No. 4,865,360, which is a division of Ser. No. 871,560, Jun. 6, 1986, Pat. No. 4,738,276. This application Mar. 29, 1989, Ser. No. 380,208

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[5] F16K *11/22*

U.S. Cl. 137—597 **5 Claims**



1. A manifold for connecting a differential pressure transmitter to a source of differential pressure, comprising:

a body having first and second input passageways adapted to be connected to the source of differential pressure, first and second instrument passageways adapted to be connected to an instrument for measuring differential pressure, and an equalizer passageway having first and second ports;

a first valve interposed between the first input passageway, the first instrument passageway and the first port of the equalizer passageway;

the first valve having a first selectable "NORMAL" position wherein the first instrument passageway is connected to the first input passageway and the first port of the equalizer passageway is blocked;

the first valve having a second selectable "ZERO" position wherein the first instrument passageway and the first input passageway is blocked;

a second valve interposed between the second input passageway, the second instrument passageway and the second port of the equalizer passageway;

the second valve having a first selectable "NORMAL" position wherein the second instrument passageway, second input passageway, and second port of the equalizer passageway are open;

the second valve having a second selectable "BLOCKED" position where the second input passageway, the second instrument passageway and the second port of the equalizer passageway are blocked, such that a normal mode is accomplished when both first and second valves are on position "NORMAL", a zero mode is accomplished by moving the first valve to position "ZERO", and then further moving the second valve to the "BLOCKED" position produces an isolation mode; and

the first and second valves being mechanically linked such that said valves co-rotate when the valves are in the "NORMAL" positions and the second valve is rotated to the "BLOCKED" position and when the valves are in the "ZERO" and "BLOCKED" positions and the first valve is rotated to the "NORMAL" position, and the valves are independently rotatable when the valves are in the "NORMAL" position and the first valve is rotated to the "ZERO" position and when the valves are in the "BLOCKED" position and the second valve is rotated to the "NORMAL" position.

4,977,918

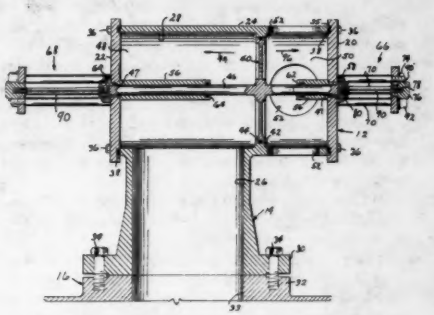
PRESSURE/VACUUM RELIEF VALVE

Julian S. Taylor, 8300 SW 8th, Oklahoma City, Okla. 73128

Filed Mar. 26, 1990, Ser. No. 498,503

Int. Cl.[5] F16K *17/40*

U.S. Cl. 137—70 **10 Claims**



1. A pressure/vacuum relief valve for a fluid containing vessel, comprising:

an elongated cylinder having a wall and having end walls closing the cylinder ends, one end portion of said cylinder wall having a first port communicating with the fluid in said vessel and the other end portion of said cylinder having a second port communicating with the atmosphere;

a piston in said cylinder normally sealed with the inner wall surface thereof between the first and second ports;

a piston rod axially projecting from said piston through the respective cylinder end wall;

elongated cage means having a closed end and an open end axially connected with the respective cylinder end wall around the respective end portion of the piston rod; and,

pressure responsive elongated pin means interposed between the respective end of the piston rod and the closed end of the respective cage for normally maintaining the piston in valve closed position.

4,977,919

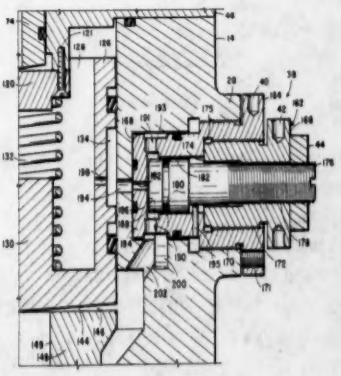
FLOW CONTROL VALVE

Eugene P. Feild, Webb City, Mo., assignor to Laminar Fluid Controls, Inc., Fort Wayne, Ind.

Continuation of Ser. No. 209,283, Jun. 20, 1988, abandoned. This application Sep. 13, 1989, Ser. No. 406,847

Int. Cl.[5] F16K *31/50*

U.S. Cl. 251—205 **12 Claims**



1. An adjustable valve assembly comprising:

a valve body having a substantially cylindrical element in threaded engagement with a tubular element, said cylindrical element being threadably shiftable to a preselected

one of an infinite number of axial positions relative to said tubular element;

an internal cavity formed in said valve body;

a first bore having one end in fluid communication with said cavity and the other end in fluid communication with the exterior of said valve body;

a valve seat mounted on said tubular element and having a hard, substantially flat working face formed thereon, said working face being in communication with said cavity;

an elongate stem in threaded engagement with a stem bore formed in said cylindrical element and having a hard, substantially flat working face substantially opposite said seat working face, said stem working face being movable toward and away from said seat working face responsive to threadable shifting of said cylindrical element relative to said tubular element;

a second bore extending into said seat from the working face thereof and having a substantially smaller diameter than the diameter of said seat working face;

means coupled with said valve body for permitting a flow of fluid through said second bore, such a flow having a rate which varies in response to the relative positions of said working faces;

means for preventing removal of said cylindrical element from said tubular element;

means for fixing said stem in a preselected one of an infinite number of axial positions relative to said cylindrical element; and

an annular shoulder formed on said cylindrical element for flushly abutting an opposing annular shoulder formed on said tubular element thereby placing said cylindrical element in a predetermined axial position relative to said tubular element when said shoulders abut one another.

4,977,920

PIPE INTERRUPTER

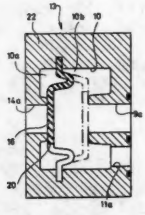
Hans Oberdörfer, Stuttgart, Fed. Rep. of Germany, assignor to Hansa Metallwerke AG, Stuttgart, Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,343

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839650

Int. Cl.[5] F16L *55/07*; E03C *1/10*

U.S. Cl. 137—218 **1 Claim**



1. A water pipe flow interrupter (13) for sanitary installations which includes

(a) a housing (22);

(b) a chamber (10) in the housing (27),

(c) a resilient closing member (16) positioned within and dividing said chamber (10), said resilient closing member (16) comprising a peripheral portion and a non-peripheral portion,

(d) a water supply passage (9*a*) and a water discharge passage (11*a*) both opening into said chamber (10) on one side of said resilient closing member (16), and

(e) a ventilation path (14*a*) opening into said chamber on the other side of said resilient closing member (16),

characterized in that

(A) said peripheral portion of said resilient closing member (16) being fixed to the interior of said chamber (10),

(B) said non-peripheral portion of said resilient closing member (16) being flexible and being movable from a first position to a second position within said chamber (10) depending upon the pressure of the water in said supply passage (9*a*), namely

when the water pressure in the supply passage (9*a*) is not reduced said non-peripheral portion moves to a first position to bear against and close the opening of the ventilation path (14*a*), and

when the water pressure in the supply passage (9*a*) is reduced said nonperipheral portion moves to a second position to bear against and close the opening of the supply passage (9*a*),

(C) a portion of said non-peripheral portion of said resilient closing member being provided with an opening (20), said opening (20) being located in said non-peripheral portion so that air may flow from the ventilation path (14*a*) to the discharge passage (11*a*) when said non-peripheral portion is in said second position closing off water flow through said supply passage (9*a*) and located so that no air will flow from the ventilation path (14*a*) to the discharge passage (11*a*) when said non-peripheral portion is in said first position.

4,977,921

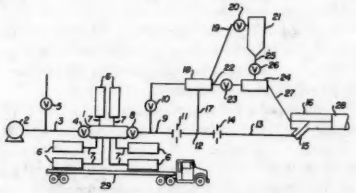
HIGH GAS FLOW RATE PRODUCTION

Larry F. Knight, Seabrook; Daniel K. Ogilvie, Missouri City, and Ronny W. Worsham, Pasadena, all of Tex., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 20, 1989, Ser. No. 409,766

Int. Cl.[5] B08B *9/00*

U.S. Cl. 137—266 **11 Claims**



1. An apparatus for the providing of gas to a large size line having high gas flow rate requirements, comprising:

(a) header means for the distribution of gas to be passed to a large size line at high flow rates therein;

(b) control valve means at the discharge end of said header means, said discharge end control means being adapted to provide for the discharge of gas at a rate sufficient to provide the desired high flow rate in said downstream large size line;

(c) pumping means suitable for the supply of gas to said header means at a desired elevated pressure suitable for the providing of said gas to said large size line at high flow rates;

(d) a series of high pressure individual tubes adapted for the storage of gas at elevated pressure for use in providing said high flow rate of gas in said large size line, said series of individual tubes and said header means and control valve means being mounted on a movable trailer for ready delivery to a job site having said high gas flow rate requirements;

(e) gas connecting lines extending from each of said individual gas storage tubes to said header means, said lines providing for the flow of gas from the header to said tubes upon application of said pumping means and the control valve means at the discharge end thereof being closed, and

for the flow of gas from the tubes to the header for passage of the high flow rate line when said control valve means at the discharge end thereof is open,

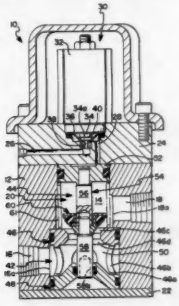
whereby gas is conveniently pumped through said header means to the individual tubes at an elevated pressure for subsequent discharge through said header means to the large size line having high gas flow requirements at a job site.

4,977,922

REVERSIBLE POPPET VALVE CARTRIDGE WITH SINGLE PIECE STEM

Dennis M. McWilliams, Galesburg, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 5, 1989, Ser. No. 402,396
Int. Cl.[5] F16K *31/122*
U.S. Cl. 137—269 **3 Claims**



1. A poppet valve cartridge adapted to be installed in a bore of a valve body; the cartridge comprising:

a sleeve assembly having an inner volume defined by first and second annular members concentric to a common axis and axially spaced apart by an apertured means extending therebetween, first and second mirror image valve seats facing axially in opposite directions about a periphery of a central opening in the first annular member;

a poppet assembly including a piston axially spaced from an end of the sleeve assembly defined by the first annular member, a spring reacting between the sleeve assembly and piston for applying a force biasing the piston axially away from the sleeve assembly, a generally axially facing poppet surface defined by a poppet concentrically affixed to a stem affixed at one end to the piston and extending axially therefrom through the central opening and slidably received in a guide opening in the second annular member, the stem affixable to the piston with the poppet surface disposed between the piston and the first seat and movable into abutting engagement therewith in response to a force applied to the piston counter to the spring force, whereby the cartridge is normally open, and the stem affixable to the piston with the poppet surface abuttingly engaging the second valve seat and movable therefrom in response to the counter force applied to the piston, whereby the cartridge is normally closed; and

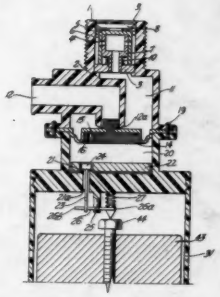
the stem being a single member having first and second ends with the poppet surface facing the first end and being axially spaced further from the first end than from the second end, the first end affixed to the piston to form the normally closed cartridge, and the second end affixed to the piston to form the normally open cartridge.

4,977,923

PILOT-CONTROLLED WATER PRESSURE-OPERATED DIAPHRAGM SHUT-OFF VALVE

Chan-Dong Cho, 334-42 Yunhee-Dong, Seodaemoon-Gu, Seoul 120-110, Rep. of Korea

Filed May 3, 1989, Ser. No. 346,879
Claims priority, application Rep. of Korea, May 4, 1988, 88-6797; Feb. 23, 1989, 89-1924
Int. Cl.[5] F16K *31/128, 31/34*
U.S. Cl. 137—414 **5 Claims**



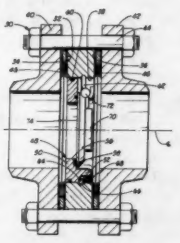
1. A pilot controlled diaphragm shut-off valve (13) being operated by pressure change from a pilot pressure chamber (20), said valve (13) comprising; a volumetrically deformable elastic cushion body (22) provided in said pilot pressure chamber (20) for a pilot valve (24) being movable between open and closed positions by an actuator (32, 43).

4,977,924

SWING CHECK VALVE WITH SECURED CAGE

John P. Scaramucci, 10724 Woodridden, Oklahoma City, Okla. 73170

Division of Ser. No. 286,979, Dec. 20, 1988. This application Nov. 1, 1989, Ser. No. 430,526
Int. Cl.[5] F16K *15/03*
U.S. Cl. 137—454.2 **12 Claims**



1. A swing check valve, comprising:

a body having a planar upstream and downstream ends and a bore therethrough interconnecting the upstream and downstream ends;

a valve in the bore;

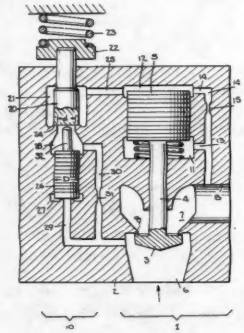
a disc sized to mate with the seat;

a removable ring-shaped cage in the bore supporting the disc for pivotal movement toward and away from the seat;

means for securing the cage to the wall of said bore against upstream and downstream movement, including mating grooves in the outer periphery of the cage and the wall of said bore, and means extending into said mating grooves; and

wherein said first mentioned means includes a member threaded into the cage holding the second mentioned means in said grooves.

4,977,925
SAFETY VALVE
Edelbert Tiefenthaler, Elgg, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland
Filed Oct. 4, 1989, Ser. No. 416,877
Claims priority, application Switzerland, Oct. 13, 1988, 3822/88
Int. Cl.[5] G05D *16/10*
U.S. Cl. 137—489.5 **8 Claims**



1. In combination,

a safety valve having a flow chamber for connection with a chamber to be protected against excessive pressure, an outlet chamber, a main lid, a survopiston connected to said lid for moving said lid between a closed position closing said chambers relative to each other and an open position communicating said chambers with each other, and a servopiston chamber on a side of said servopiston remote from said main lid;

a pilot valve having a third chamber, a valve seat opening into said third chamber and a pilot valve lid biased against said valve seat to close said third chamber;

a movably mounted piston mounted independently from said pilot valve lid having means for moving said pilot valve lid from said valve seat, said piston having a cross-sectional area greater than the area of said pilot valve lid exposed to said valve seat;

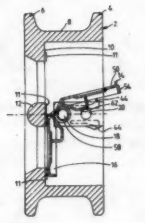
a fourth chamber receiving one end of said piston and communicating with said valve seat of said pilot valve;

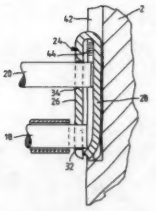
a line having a restriction therein and communicating said fourth chamber with the chamber to be protected;

a fifth chamber receiving a second end of said piston and communicating with the chamber to be protected; and

a line communicating said third chamber with said servopiston chamber whereby upon opening of said pilot valve lid from said valve seat, said fourth chamber communicates with said third chamber and said main lid is moved into said open position thereof.

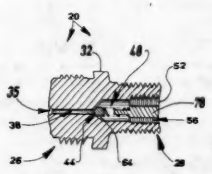
4,977,926
CHECK VALVE
Gary A. Hocking, Doncaster, Australia, assignor to Stockham Valve Australia Pty. Ltd., Thomastown, Australia
Filed Sep. 20, 1989, Ser. No. 409,673
Claims priority, application Australia, Sep. 21, 1988, PJ0560; Sep. 21, 1988, PJ0561
Int. Cl.[5] F16K *15/03*
U.S. Cl. 137—512.1 **9 Claims**





1. A clip for use in a check valve having a valve body, said clip including first and second recess for receipt, in use, of hinge and stop pins having respective axes and integral resilient projections for resiliently engaging and interlocking with the valve body, said projections being resiliently deflectable in a plane transverse to said axes.

4,977,927
FREE FLOW FITTING
James H. Hill, Rte. 2, Box 40, Searcy, Ark. 72143
Filed Jan. 16, 1990, Ser. No. 465,440
Int. Cl.[5] F16K *15/00, 17/06*
U.S. Cl. 137—539 **10 Claims**



1. A one-way, free flowing fitting comprising:

an inlet;

an outlet having an interior threaded surface;

valve means comprising a valve seat disposed between said inlet and said outlet and valve element means for selectively blocking said valve seat;

spring means for normally yieldably biasing said valve element means into blocking contact with said valve seat;

rigid retainer means for insuring consistent flow through said fitting, said retainer means comprising a block disposed within said outlet and a rigid stem projecting away from said block and coaxially penetrating said spring;

wherein a positive flow path is defined between said block and said outlet, and said block is generally in the form of a parallelipiped including a pair of spaced apart faces and a pair of threaded edges, and said positive flow path is at least in part defined between said block faces and said interior threaded surface of said outlet; and,

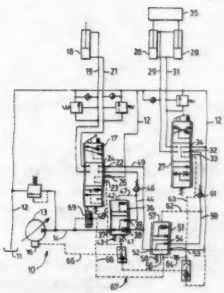
whereby positive one-way flow is maintained through said inlet, around said valve element means and around said spring, and through said outlet around said retainer means.

4,977,928

LOAD SENSING HYDRAULIC SYSTEM

Glenn G. Smith, Lockport, and Edward L. Stapleton, Joliet, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed May 7, 1990, Ser. No. 520,007
Int. Cl.[5] F15B *13/06*
U.S. Cl. 137—596 **5 Claims**



1. A load sensing hydraulic system comprising:

a tank;

a return conduit connected to the tank;

a variable displacement hydraulic pump;

a supply conduit connected to the pump;

a directional control valve moveable between a neutral and first and second operating positions;

a pressure compensated flow control valve connected to the supply conduit;

a supplemental supply conduit connected to the directional control valve and to the flow control valve;

a second pressure compensated flow control valve connected to the supplemental supply conduit and to the return conduit and being moveable between a first position at which the supplemental supply conduit is blocked from the return conduit and a second position at which the supplemental supply conduit communicates with the return conduit, said second flow control valve having first and second ends and a spring disposed at the first end biasing the valve to the first position; and

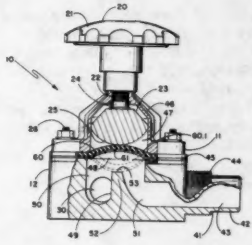
means for communicating fluid from the supply conduit to the first end of the second flow control valve when the directional control valve is in either the neutral or the first operating position and for blocking communication between the supply conduit and the first end of the second flow control valve when the directional control valve is in the second operating position.

4,977,929

WEIR VALVE SAMPLING/INJECTION PORT

Robert T. Chinnock, Victoria, and Jeffrey J. McKenzie, Watertown, both of Minn., assignors to Fluoroware, Inc., Chaska, Minn.

Filed Jun. 28, 1989, Ser. No. 372,647
Int. Cl.[5] F16K *7/12*
U.S. Cl. 137—863 **3 Claims**



1. A weir valve for fluids comprising

a valve housing having an open interior and (a) an elongate weir traversing the open interior and dividing the interior into first and second chambers at opposite sides of the weir, said second chamber being elongate and extending along the weir, said second chamber having opposite end portions and being substantially free of obstructions to fluid flow longitudinally therethrough,

operating means including a diaphragm having a portion lying across the weir to prevent fluid flow over the weir and between the chambers,

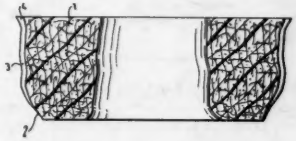
the housing having a flow port communicating with said first chamber and a pair of fluid flow ports respectively communicating with said second chamber at said opposite end portions.

4,977,930

PLUG FOR WRAPPED SLEEVES OF PAPER OR CARDBOARD

Edmund Munk, Oberstenfeld, and Helmuth Huber, Gronau, both of Fed. Rep. of Germany, assignors to Werzalit AG & Co., Stuttgart, Fed. Rep. of Germany

Filed Mar. 24, 1988, Ser. No. 173,155
Claims priority, application European Pat. Off., Oct. 31, 1987, 87116059.4
Int. Cl.[5] F16L 11/12; B65H 75/18
U.S. Cl. 138—89 **4 Claims**



1. A one-piece plug formed of a mixture of fibrous material and a heat-hardenable binder and used for sleeves wrapped of paper or cardboard, comprising a substantially rotation-symmetrical hollow body including a cylindrical part which extends over approximately half of a length of said body and has a constant external diameter, and a remaining frustoconical part, said body having a peripheral surface provided with axial thickenings extending along an axis of said body and spaced from each other on a circumference of said body, said body

having an outer edge portion at said cylindrical part, said outer edge portion starting at a point of approximately 90% of the entire length of said body and having an annular thickening continually increasing towards an end face of said body, said axial thickenings extending over said frustoconical part, said cylindrical part and said annular thickening.

4,977,931

METHOD OF PRODUCING REINFORCED RIBBED TUBES

Stanley W. O. Menzel, Burnside, Australia, assignor to Rib Loc Australia Pty. Ltd., The Levels, Australia

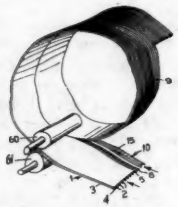
PCT No. PCT/AU87/00190, § 371 Date Mar. 3, 1988, § 102(e) Date Mar. 3, 1988, PCT Pub. No. WO88/00129, PCT Pub. Date Jan. 14, 1988

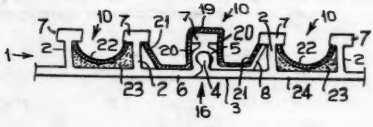
PCT Filed Jun. 30, 1987, Ser. No. 191,163

Claims priority, application Australia, Jul. 3, 1986, PH06719; Apr. 6, 1987, P11267

Int. Cl.[5] F16L 11/11

U.S. Cl. 138—154 8 Claims





1. A method of reinforcing a structure comprising joining edge portions of at least one ribbed strip formed of a plastics material to form a tube wherein said ribbed strip comprises an array of flanged ribs spaced apart between said edge portion and upstanding from a common base, engaging at least one outwardly opening concave reinforcing member at least between adjacent flanged ribs within the array to interlock edges of the reinforcing member with the flanges of the adjacent ribs and constitute a means for increasing the deflection resistance of the structure.

4,977,932

EDGE GUIDE FOR WEFT GRIPPER BELT

Luigi Pezzoli, Leffe, Italy, assignor to Vamatex S.p.A., Villa Di Serio, Italy

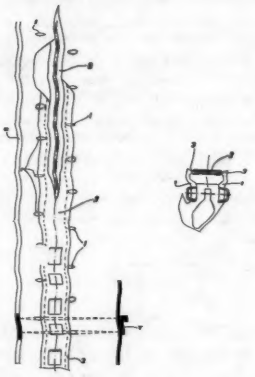
Filed Aug. 7, 1989, Ser. No. 389,973

Claims priority, application Italy, Sep. 8, 1988, 21865A/88

Int. Cl.[5] D03D 47/14

U.S. Cl. 139—449 6 Claims

1. Means to guide the motion of a pair of weft grippers inside the shed of a shuttleless loom, in which two control straps each carrying one of the grippers move on a substantially horizontal plane under the action of two gearwheels with reciprocating motion, and a plurality of elements guide the straps in this motion, said guide elements being aligned on a sley facing a reed of the loom and positioned perpendicularly thereto, the straps having a substantially rectangular section of greater width than thickness and a shaped recess extending along each



longitudinal side edge, the guide elements comprising substantially horizontal tooth projections, shaped like and engaged in said recesses.

4,977,933

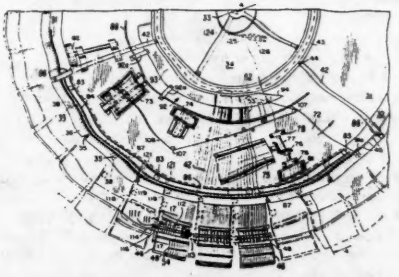
CIRCULAR LOOM FOR WEAVING RIBBON-SHAPED MATERIALS

Joseph E. Brais, Warwick, R.I., assignor to Joss Company, Carolina, R.I.

Continuation of Ser. No. 738,461, May 28, 1985, abandoned, which is a continuation of Ser. No. 172,863, Aug. 18, 1971, abandoned. This application Feb. 21, 1989, Ser. No. 314,232

Int. Cl.[5] D03D 37/00

U.S. Cl. 139—459 59 Claims



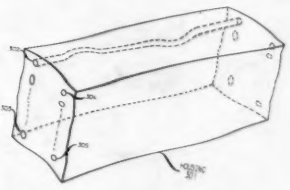
31. A circular loom for weaving ribbon-shaped thread which comprises: a supporting structure; a shuttle assembly adapted for travel about a circular track on said supporting structure; a weft supply of ribbon-shaped thread carried by said shuttle assembly; orienting means on said shuttle assembly for orienting warp ends in advance of said shuttle assembly; an electric motor mounted on said shuttle assembly; means for rotatably connecting said warp end orienting means to said motor; and warp shed forming means connected to said shuttle assembly to form said oriented warp ends into a warp shed through which the shuttle assembly travels to form the tubular fabric.

4,977,934

MULTIPLE WIRE STRAIGHTENER MODULE FOR AN AUTOMATED CABLE ASSEMBLY SYSTEM

Carl R. Anderson, Arvada, and Gary G. Seaman, Broomfield, both of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 27, 1990, Ser. No. 485,684
Int. Cl.[5] B21F 1/02; B21D 3/00
U.S. Cl. 140—147 19 Claims



1. An apparatus for straightening an elongated member, comprising:

a continuous tube having a bend extending entirely in a first plane and having a bend extending entirely in a second plane perpendicular to said first plane; and

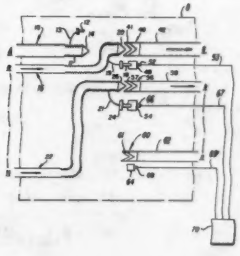
a mechanism for transferring said member through said tube whereby said member is bent in said first plane and then bent in said second plane.

4,977,935

INTERLOCK SYSTEM

William D. Durkee, Jr., Selkirk, and Philip J. Muller, Ravena, both of N.Y., assignors to General Electric Company, Selkirk, N.Y.

Filed Oct. 20, 1989, Ser. No. 424,488
Int. Cl.[5] B65B 1/04; B67C 3/00
U.S. Cl. 141—99 16 Claims



1. An interlock system for establishing a different set of operating parameters for each of a number of different operations of an apparatus, each of said operations requiring the interconnection of different pieces of equipment selected from first and second pluralities of said equipment pieces, each of said parameter sets being designated by a different multi-digit binary code; said interlock system comprising:

a movable information carrier assigned to each of said first, plurality of equipment pieces, each of said carriers containing information representative of a different one of said codes;

a control unit assigned to each of said second plurality of equipment pieces;

each of said control units including signal circuit means and further including signal probe means responsive to the information on said carriers for connecting or disconnecting said signal circuit means;

means for positioning the assigned carrier and control unit of each pair of equipment pieces, selected for interconnection pursuant to a chosen operation so that the information on said assigned carrier is placed proximate the probe means of said assigned control unit clear of any intervening structure; and

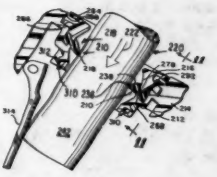
means for deriving a binary output signal from said signal circuit means representative of the code on said assigned carrier, said output signal being effective to establish a set of operating parameters applicable to said chosen operation.

4,977,936

FILLER NECK SEALING ASSEMBLY

Robert H. Thompson, Dearborn Heights, Mich.; Emil Szlaga, and Robert S. Harris, both of Connersville, Ind., assignors to Stant Inc., Connersville, Ind.

Continuation-in-part of Ser. No. 148,384, Jan. 25, 1988, Pat. No. 4,883,103, which is a continuation-in-part of Ser. No. 106,632, Oct. 8, 1987, Pat. No. 4,816,045, which is a continuation-in-part of Ser. No. 846,081, Mar. 31, 1986, Pat. No. 4,770,677. This application Aug. 30, 1989, Ser. No. 400,815
Int. Cl.[5] B67D 5/04; B01D 19/00
U.S. Cl. 141—312 35 Claims



1. A filler neck seal assembly adapted to seal a fuel nozzle in a fuel filler neck comprising

an elastic seal member having an annular fuel nozzle-sealing portion and an annular filler neck-mounting portion surrounding the annular fuel nozzle-sealing portion in radially outwardly spaced relation,

a seal retainer including means adapted for engaging a filler neck containing the elastic seal member and means adapted for unyieldingly clamping the annular filler neck mounting portion of the elastic seal member to the filler neck to establish a fixed circumferentially extending liquid fuel and fuel vapor seal between the elastic seal member and the filler neck and adapted to also cantilever the annular fuel nozzle-sealing portion for movement relative to the clamped filler neck-mounting portion in response to engagement with a fuel nozzle during movement of the fuel nozzle in the filler neck, and

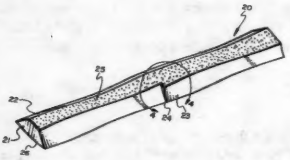
wherein the annular fuel nozzle-sealing portion includes an annular, radially inwardly facing, perimeter end wall defining a nozzle-receiving aperture, and inclined annular outer sealing face adapted to face in an axially outwardly direction toward a mouth of the filler neck to engage the nozzle in sealing relation during insertion of the nozzle into the nozzle-receiving aperture, and an inclined annular inner sealing face adapted to face in an axially inwardly facing direction away from the filler neck mouth to engage the nozzle in sealing relation during withdrawal of the nozzle from the nozzle-receiving aperture, and the outer and inner sealing faces are interconnected by the annular, radially inwardly facing, perimeter end wall and diverge in a radially outwardly extending direction away from the perimeter end wall and toward the filler neck-mounting portion.

4,977,937

MULTIPLE ANGLE JOINTER AND PLANER KNIVES

George D. Hessenthaler, 585 W. 3900 South, #6, Murray, Utah 84123

Filed Feb. 16, 1990, Ser. No. 480,794
Int. Cl.[5] B27G 13/00; B27C 1/00
U.S. Cl. 144—241 4 Claims



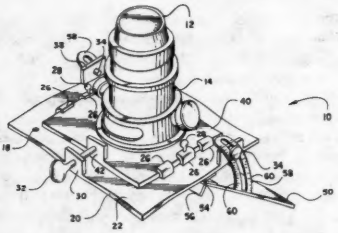
1. A blade for mounting in a rotating cutterhead of a woodworking machine comprising a narrow rectangular section of steel appropriate dimensions and hardness for forming a blade having parallel long edges and parallel top and bottom faces for installation in a rotating cutterhead of a jointer or planer woodworking machine, that has at least two cutting edges of different sharpness angles ground along said parallel long edges of said blade, and said blade is mounted to expose one said cutting edge as is appropriate for planing a particular type of hardness of wood.

4,977,938

CUTTING GUIDE FOR PORTABLE ROUTER

Ewell E. Greeson, 3801 Maryland Dr., Doraville, Ga. 30340

Filed May 16, 1989, Ser. No. 352,406
Int. Cl.[5] B27C 5/10
U.S. Cl. 144—134 D 16 Claims



1. An accessory for a router having a bit, comprising:

a base having an opening;

first means for mounting the router on said base with the bit of the router extending through said opening of said base;

second means for receiving the workpiece and facilitating alignment of the bit and the workpiece as the workpiece is cut by the bit, said second means including a guide fence defining a guide fence opening therethrough along an edge of said guide fence for allowing projection of the bit of the router; and

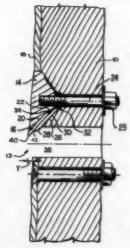
hinge means for coupling said guide fence to said base along said edge of said guide fence having said opening, and establishing a hinge axis on a surface of said base proximate to said opening of said base, about which said hinge axis said guide fence is pivotable between a horizontal position wherein said guide fence is parallel to said surface of said base and a vertical position wherein said guide fence is perpendicular to said surface of said base.

4,977,939

KNIFE ASSEMBLY FOR CHIPPER

Garth D. Depuy, Carthage, and Eugene A. Farrell, Fisher Landing, both of N.Y., assignors to Carthage Machine Company, Carthage, N.Y.

Filed May 7, 1990, Ser. No. 519,945
Int. Cl.[5] B27C 7/10; B02C 18/18
U.S. Cl. 144—176 4 Claims



1. A chipper knife assembly for a chipper device of the type having a plurality of such knife assemblies readily disposed on a front face of said rotary disk, each blade assembly being disposed adjacent to a chip slot that passes axially through the disk; each said knife assembly comprising a first elongated flat knife blade having a base surface of a predetermined breadth, a top surface spaced a predetermined distance from said base surface to define a thickness of the knife blade, a tapered side that slopes from said top surface to the base surface to define a cutting edge of the blade, and a back surface away from said cutting edge; a second knife blade serving as a counterknife and having a flat base surface of substantially the same predetermined breadth, an opposite surface spaced substantially the same predetermined distance from the associated base surface to define substantially the same thickness for said second knife blade, a tapered side that slopes from the opposite surface to said base surface, and a back surface opposite said tapered surface, said second knife blade being disposed in a recess in said disk with said opposite surface thereof facing said disk; and a blade holder clamp for clamping the first blade against said second blade in the recess in said disk, said clamp having a shoulder for engaging the back surface of said first knife blade to maintain the first blade with its cutting edge projecting out at least a predetermined amount beyond the cutting edge of said second knife blade.

4,977,940

DEVICE FOR STRAIGHTENING BOARDS

Sigmar Gonner, and Heinz-Hubert Braun, both of Oberkirch, Fed. Rep. of Germany, assignors to Gebruder Linck Maschinenfabrik "Gatterlinck" GmbH & Co. KG, Oberkirch, Fed. Rep. of Germany

PCT No. PCT/EP88/00005, § 371 Date Jun. 19, 1989, § 102(e) Date Jun. 19, 1989, PCT Pub. No. WO88/05371, PCT Pub. Date Jul. 28, 1988
PCT Filed Jan. 5, 1988, Ser. No. 377,834
Claims priority, application Fed. Rep. of Germany, Jan. 16, 1987, 3701127
Int. Cl.[5] B25H 1/00
U.S. Cl. 144—255 16 Claims

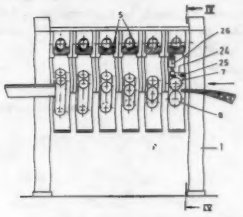
1. Apparatus for straightening twisted boards, comprising:

a main frame having a board inlet end and a board outlet end spaced from said board inlet end, in a longitudinal direction,

a plurality of frames mounted in said main frame for pivotal movement relative to said main frame and relative to one another about a pivot axis extending substantially in said longitudinal direction; and

a pair of rollers mounted in each of said frames for rotation

about axes extending transversely relative to said longitudinal direction, said roller pairs defining a channel for conducting boards from said inlet end to said outlet end;



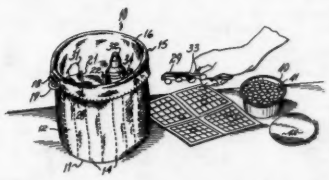
said frames being pivotally offset relative to one another whereby said channel defined by said roller pairs is twisted about said longitudinal direction.

4,977,941

BINGO BAG WITH SELF-SUPPORTING VERTICAL WALL

Esther L. Henderson, 3399 Ludlow Circle, Amelia, Ohio 45102

Filed Mar. 19, 1990, Ser. No. 495,636
Int. Cl.[5] A45C *3/06*; B65D *33/02*
U.S. Cl. 150—112 **8 Claims**



1. A bingo bag comprising:

triple-ply quilt material comprised of a laminate of two fabrics with a batting therebetween and stitched together to form self-supporting vertical wall defining a hollow container that is open at its upper end,

two-ply fabric material forming a hem about the upper end,

drawstring means passing through the hem for closing the upper end,

a separate piece of fabric stitched to the inner surface of said container vertical wall and forming a plurality of pockets,

said pockets containing at least a magnet sweep for picking up bingo markers, and an ink bingo marker,

a closed container of ferromagnetic bingo markers in the bottom of said bag.

4,977,942

PNEUMATIC TIRE HAVING DEFINED LUG GROOVE CONFIGURATION

Kiyoshi Ochiai, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

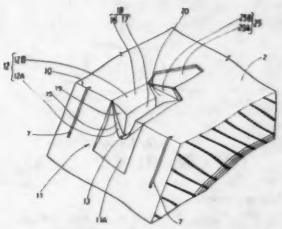
Filed Aug. 29, 1989, Ser. No. 399,968
Claims priority, application Japan, Aug. 31, 1988, 63-219154
Int. Cl.[5] B60C *11/04*
U.S. Cl. 152—209.00 B **3 Claims**

1. A pneumatic tire having a tread provided with a rib-lug type tread pattern comprising longitudinal grooves extending circumferentially of the tire to form at least one rib in a tread crown region, lug grooves extending axially of the tire to form lugs in tread shoulder regions, and sipes formed in the tread shoulder regions extending axially inward from each tread edge,

each lug groove composed of an axially outer part having side walls with a single inclination of an angle L3 and an axially inner part having side walls with a double inclination,

each side wall of the axially inner part composed of an upper wall inclined at an angle L1 and a lower wall inclined at an angle L2,

the angle L1 being more than 35 degrees, the angle L3 being



smaller than the angle L1 and the angle L2 being smaller than the angle L3,

the axial length B of the axially outer part being more than 0.2 and less than 0.4 times the total axial length A of the lug groove,

the depth H1 of the upper walls of the axially inner part being more than 0.15 and less than 0.50 times the full depth H of the axially inner part,

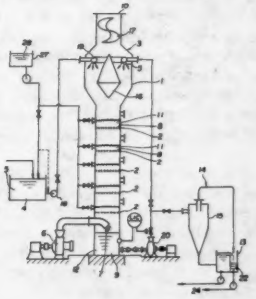
the axial length W1 of each sipe being less than 0.3 times the axial length A of the lug grooves at the tread face of the tread.

4,977,943

WASTE PAPER DE-INKING PROCESS USING MULTI-STAGE VERTICAL COLUMN VAPOR-LIQUID MIXER

Noriji Miyabe, Ishinomaki, Japan, assignor to Jujo Paper Co., Ltd., Tokyo, Japan

Filed May 9, 1989, Ser. No. 349,080
Claims priority, application Japan, May 14, 1988, 63-117858
Int. Cl.[5] D21C *5/02*
U.S. Cl. 162—4 **12 Claims**



1. A waste paper de-inking process comprising the steps of:

supplying waste fiber paper dissolving slurry from above a high tower multi-stage vapor-liquid mixer having at least one porous plate in each of a multiplicity of stages arranged in a vertical column;

supplying de-inking treating has which does not damage the fiber from below said vapor-liquid mixer, said waste paper

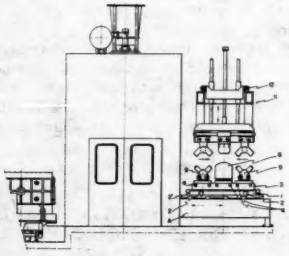
dissolving slurry thus supplied dropping from porous plates of the respective stages to lower stages, said de-inking treating gas being raised from the porous plates of the respective stages to upper stages to form an agitated mixture layer of the waste paper dissolving slurry and the treating gas on each porous plate of the respective stages; adding de-inking agent to each respective agitated mixture layer on the porous plates in said vapor-liquid mixer; and in the agitated mixture layer, separating and finely pulverizing adhered matters adhered to the fiber and foreign matters in the waste paper dissolving slurry, absorbing and containing the de-inking treating gas in the waste paper dissolving slurry, and gathering the treated slurry in a bottom of the vertical column.

4,977,944

CORE BLOWING MACHINE

Agustin A. Erana, Zorrestea, 4 Polígono Ind. Ali-Gobeo, 01010 Vitoria Alava, Spain

Filed Feb. 7, 1989, Ser. No. 307,405
Claims priority, application Spain, Feb. 12, 1988, 8800401
Int. Cl.[5] B22C *11/08, 19/00*
U.S. Cl. 164—186 **3 Claims**



1. In a core blowing machine for forming and assembling cores to form a block, comprising a core collecting device including trays for collecting individually formed cores, wherefrom cores are moved to a device for joining cores to each other to form the block and placed in due order and position, the improvement comprising said core collecting device including a support bed having first guides thereon, a carriage which is guided on said first guides in a first direction lengthwise of said carriage and longitudinally with respect to an area where the blowing machine deposits individual cores, a frame which is common to all said core collecting trays and integral with said carriage, second guides positioned in said frame, a plurality of slide blocks adapted to slide on said second guides in a second direction transversal to said first direction, and a plurality of tray supports each hingedly connected to a respective slide block so that each tray support can be tilted between a horizontal position and a vertical position, each core collecting tray being connected to a respective one of said supports; and a handler for receiving the cores from said core collecting device to transfer the cores to a block shaping device of the blowing machine, whereby a group of core collecting trays is displaceable in a longitudinal direction with respect to said area while each core collecting tray is displaceable in the direction transversal to said longitudinal direction to adopt any relative position in respect to other core collecting trays, and each tray is displaceable to assume a horizontal position to receive the cores at said area and a vertical position to supply the cores to said handler.

4,977,945

FULL MOLD COMPRISED OF A PLASTIC FOAM MATERIAL

Fridolin Bissinger, Ludwigshafen; Erich Krzyzanowski, Frankenthal, and Adalbert Wittmoser, Lampertheim, all of Fed. Rep. of Germany, assignors to Grunzweig and Hartmann und Glasfaser AG, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 317,032, Mar. 1, 1989, abandoned, which is a continuation of Ser. No. 915,759, Oct. 6, 1986, abandoned. This application Dec. 1, 1989, Ser. No. 443,036
Claims priority, application Fed. Rep. of Germany, Oct. 5, 1985, 3535603
Int. Cl.[5] B22C *7/02, 9/04*
U.S. Cl. 164—235 **8 Claims**

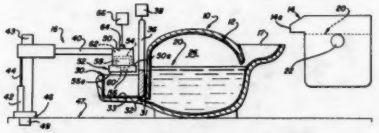
1. In a full mold for casting products, the improvement comprising a lost pattern comprised of a plastic foam material which is substantially sulfur-free.

4,977,946

DIFFERENTIAL PRESSURE, COUNTERGRAVITY CASTING OF INDIVIDUAL CHARGES OF MELT FROM A CASTING BASIN

Eugene W. Borrousch, and Frank R. Green, both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 25, 1990, Ser. No. 529,236
Int. Cl.[5] B22D *18/06, 27/20*
U.S. Cl. 164—57.1 **12 Claims**



1. Apparatus for the differential pressure, countergravity casting of a melt into a plurality of casting molds, comprising:

(a) vessel means including a melt-holding chamber, a casting basin in flow communication with the melt-holding chamber and means for admitting a plurality of charges of the melt in succession from the chamber to the casting basin, each charge being of a selected amount sufficient to cast only one of the molds,

(b) means for immersing each mold in a respective one of the charges of the melt admitted to the casting basin, and

(c) means for establishing a sufficient differential pressure between each mold and the charge in which it is immersed to draw the charge upwardly from the casting basin into each mold, leaving the casting basin with insufficient charge to cast the next mold,

whereupon the casting basin is then supplied with the next charge of the melt for casting the next mold of the plurality of molds.

10. A method for the differential pressure countergravity casting of a melt into a plurality of casting molds, comprising the steps of:

(a) holding the melt in a melt-holding chamber,

(b) admitting a charge of the melt from the chamber to a casting basin that is in flow communication therewith in a selected amount sufficient to cast only one of the molds,

(c) differential pressure, countergravity casting one of the molds from the charge in the casting basin, leaving insufficient charge in the casting basin to cast the next mold, and

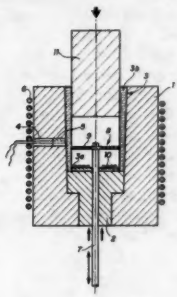
(d) repeating steps (b) and (c) to countergravity cast the next charge of the melt into the next mold of the plurality of molds.

4,977,947

METHOD AND A DEVICE FOR HOMOGENIZING THE INTIMATE STRUCTURE OF METALS AND ALLOYS CAST UNDER PRESSURE

Peter Boswell, Carouge; Guy Negaty-Hindi, Onex, and Tatiana Berce, Geneva, all of Switzerland, assignors to Battelle Memorial Institute, Carouge, Switzerland

Filed Jan. 29, 1990, Ser. No. 471,432
Claims priority, application European Pat. Off., Jan. 31, 1989, 89810079.7
Int. Cl.[5] B22D *27/08, 27/11*
U.S. Cl. 164—71.1 10 Claims



1. A method for homogenizing the internal structure of a metal or alloy cast under pressure, said method comprising the steps of:

filling a heated mold with the metal or alloy, the metal or alloy being in molten form;

lowering a ram into the mold;

moving a baffle with openings therein along a vertical reciprocal path in the molten metal, thereby forcing the molten metal through the openings of the baffle to produce turbulent flow of the molten metal, the baffle moving with such a velocity so as to ensure adequate mixing of the metal before solidification occurs;

stopping the baffle at a lower position when the metal becomes excessively viscous upon partial solidification; and

extracting the cast metal or alloy, said cast metal or alloy having a finely grained internal structure with microspheroidal cells.

4,977,948

COUNTERGRAVITY CASTING APPARATUS AND METHOD USING ELASTOMERIC SEALING GASKET AND COOLED VACUUM CHAMBER

George D. Chandley, Amherst, N.H., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 219,460, Jul. 15, 1988, abandoned. This application Sep. 20, 1989, Ser. No. 411,187
Int. Cl.[5] B22D *18/06*
U.S. Cl. 164—255 3 Claims

1. Apparatus for the countergravity casting of molten metal, comprising:

(a) a pool of molten metal,

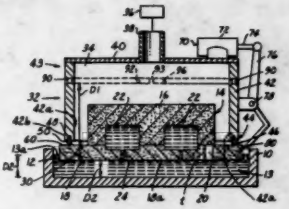
(b) a mold having a porous, gas permeable upper mold portion at least in part defining a mold cavity and having a lower mold portion with a bottom ingate for admitting molten metal into said mold cavity from the molten metal pool,

(c) a sealing surface on said mold in thermal proximity to said pool,

(d) a housing defining a vacuum chamber confronting the upper mold portion for evacuating said mold cavity through said upper mold portion, said housing having a highly thermally conductive peripheral wall consisting essentially of copper and a lip at the bottom of said wall defining a mouth of said chamber,

(e) a thermally degradeable elastomeric sealing gasket secured in thermally conductive relation to said lip for sealingly engaging said sealing surface to seal said mold to the mouth of said chamber, and

(f) means for conductively cooling said peripheral wall and said gasket, said means comprising (1) a coolant channel in



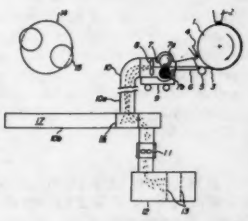
thermally conductive relation to said peripheral wall, said channel being sufficiently remote from the sealing gasket as to preclude boiling of coolant therein and (2) means for supplying liquid coolant to said channel sufficient to so cool said wall and conductively extract sufficient heat from said gasket via said wall as to substantially maintain the temperature of said gasket below its thermal degradation temperature when the lower mold portion is immersed in the molten metal pool.

4,977,949

APPARATUS FOR TRANSFERRING RAPIDLY QUENCHED METALLIC TAPES

Kiyoshi Shibuya; Toru Sato; Nobuyuki Morito; Seiko Nara, and Teruo Hiramatsu, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Continuation-in-part of Ser. No. 422,776, Oct. 17, 1989. This application Nov. 30, 1989, Ser. No. 444,030
Claims priority, application Japan, Dec. 10, 1988, 63-311023
Int. Cl.[5] B22D *11/06*
U.S. Cl. 164—417 2 Claims



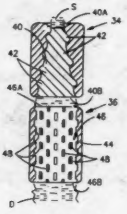
1. An apparatus for transferring a rapidly quenched metallic tape, in which the rapidly quenched metallic tape produced by solidification through rapid quenching on a circumferential surface of a single cooling roll rotating at a high speed is peeled off from the cooling roll and guided into a winder, characterized in that a transfer means provided with a pinch roll unit for catching and feeding out the peeled metallic tape and a fan for breaking and discharging the metallic tape fed out from the pinch roll unit is movably arranged on a line ranging from the cooling roll through the winder toward the rear of the winder, and further a dust device for recovering metallic pieces and powder generated in the breakage of the metallic tape by the fan is arranged in the apparatus.

4,977,950

EJECTION NOZZLE FOR IMPOSING HIGH ANGULAR MOMENTUM ON MOLTEN METAL STREAM FOR PRODUCING PARTICLE SPRAY

George J. Muench, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 13, 1989, Ser. No. 322,435
Int. Cl.[5] B22D *23/00*
U.S. Cl. 164—429 23 Claims



1. In a non-gaseous molten metal spray-depositing apparatus, the combination comprising:
(a) means for producing a stream of molten metal;
(b) means defining at least one flow channel for receiving the molten metal stream and having a configuration for confining the stream within said flow channel and mechanically imparting an angular momentum thereto as the stream passes through said channel which renders the stream unstable and produces its break-up into a molten metal spray without the use of gas when the stream becomes unconfined upon existing said orifice;
(c) means movable along a path and having an area thereon disposed below said molten metal spray for receiving a deposit of said molten metal spray to form a product on said movable means; and
(d) means for removing said deposited product from said movable means.

12. In a molten metal spray-depositing apparatus, the combination comprising:
(a) means for producing a stream of molten metal; and
(b) means defining at least a pair of upper and lower flow channels being disposed in tandem relation one above the other for receiving the molten metal stream and having configurations for confining the stream within said flow channels and mechanically imparting an angular momentum thereto as the stream passes through said channels which renders the stream unstable and produces its break-up into a molten metal spray when the stream becomes unconfined upon exiting said lower one of said orifices.

4,977,951

APPARATUS FOR FLOW CONTROL OF MOLTEN MATERIAL BY FORCE DETECTION

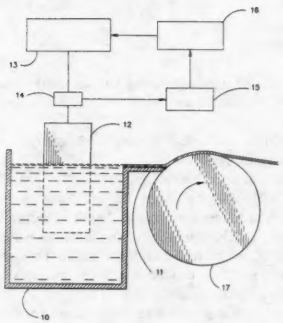
Lloyd E. Hackman, Worthington, Ohio, assignor to Ribbon Technology Corporation, Gahanna, Ohio

Filed Jan. 10, 1990, Ser. No. 462,794
Int. Cl.[5] B22D *11/06, 11/18*
U.S. Cl. 164—453 26 Claims

1. A flow rate control apparatus for the casting of filaments and sheets, said apparatus having a receptacle for containing a molten material, the receptacle having a lip over which the molten material can flow when its free surface is raised to a level above the lip, the flow control apparatus comprising:
(a) at least one movably mounted submersible body mounted for lowering into and raising out of the molten material in the receptacle for variably displacing molten material;
(b) a drive means drivingly linked to the body for raising and lowering the submersible body;
(c) a force detector connected to the submersible body for detecting the force difference between the gravitational force and the buoyant force exerted on the body;
(d) a differentiating means for detecting the time rate of change of the force difference detected by the force detector; and
(e) a control means responsive to the differentiating means and connected to control the drive means for lowering the submersible body at a rate which maintains a constant time rate of change of the force difference detected by the force detector

whereby, in a steady state condition of operation, a constant rate of change of the detected force difference is produced which effects a constant rate of molten material flow over the lip from the receptacle.

17. An improved method for controlling the flow rate of molten material being cast from a receptacle for containing a molten material, the receptacle having a lip over which the molten material can flow when its free surface is raised to a level above the lip, the method comprising:
lowering a submersible body into the molten material while detecting the rate of molten material displacement by the body, said body being lowered at a selected, instantaneous molten material displacement rate equal to the desired instantaneous flow rate.



23. A level control apparatus for the casting of filaments and sheets, said apparatus having a receptacle for containing a molten material, the receptacle having a lip over which the molten material can flow when its free surface is raised to a level above the lip, the control apparatus comprising:
(a) a submersible body mounted to extend partially into the molten material in the receptacle;
(b) a force detector connected to the submersible body for detecting the force difference between the gravitational force and the buoyant force exerted on the body;
(c) a supply vessel containing molten material and having a supply conduit including a controllable valve means and arranged to supply molten material into the receptacle at a rate controlled by the valve means; and
(d) a control means responsive to the force detector and connected to adjust the valve means to maintain a constant force on the force detector.

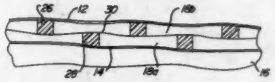
25. An improved method for controlling the free surface level of molten material being cast from a receptacle having a lip over which the molten material can flow when its free surface is raised to a level above the lip, the method comprising:
detecting the force exerted by a body which is supported partially submersed in the molten material in the receptacle and supplying molten material into the receptacle at a rate which maintains that force constant.

4,977,952

HEAT STORAGE MEANS, MORE ESPECIALLY A LATENT HEAT STORAGE MEANS FOR MOTOR VEHICLE HEATING MEANS SUPPLIED WITH WASTE HEAT FROM THE ENGINE

Oskar Schatz, Waldpromenade 16, D-8035 Gauting, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 224,820
Int. Cl.[5] F28D *20/00*
U.S. Cl. 165—10 8 Claims



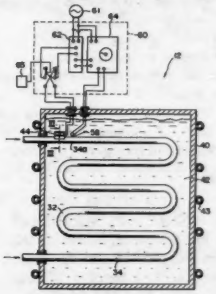
1. A latent heat storage means supplied with engine waste heat, comprising an inner housing (14) surrounding a storage core (16), an outer housing (12) surrounding the inner housing (14) with a clearance and a load bearing thermal insulation means (26,28) between the inner housing and the outer housing, characterized in that the load bearing thermal insulation means (26,28) includes a plurality of insulating support members positioned between said inner and outer housing, and a foil positioned within said clearance, said foil separating said clearance into an inner space (18*a*) and an outer zone (18*b*).

4,977,953

LATENT HEAT REGENERATING APPARATUS

Katsuaki Yamagishi; Koji Kashima; Akio Mitani, all of Yokohama, and Masatoshi Shimura, Mishima, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 28, 1989, Ser. No. 330,341
Claims priority, application Japan, Mar. 31, 1988, 63-76134
Int. Cl.[5] F28D *20/00*
U.S. Cl. 165—10 19 Claims



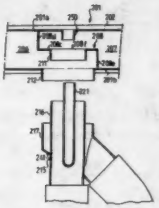
1. A latent heat regenerating apparatus comprising:
a regenerative tank;
a latent heat regenerative material in the regenerative tank, having a phase transition temperature and a supercooling-release temperature, said regenerative material being capable of maintaining a supercooled state in a temperature range between said temperatures;
a heat exchanger arranged in the regenerative material and allowing circulation of a refrigerant so that heat is exchanged between the refrigerant and the regenerative material; and
supercooling control means for controlling supercooling of the regenerative material, said control means including a thermoelectronic cooling element arranged in the regenerative material, said element having a heat radiating portion for radiating heat into the regenerative material and a heat absorbing portion for absorbing heat from the regenerative material, said element being arranged so that heat is transferred between a surface of the heat exchanger and one of the heat radiating and absorbing portions.

4,977,954

RAPID ACTION COUPLING SYSTEM FOR A HEAT EXCHANGER FLUID TANK

Michel Potier, Rambouillet, and Gilles Briet, Gueugnon, both of France, assignors to Valeo Thermique Moteur, Le Mesnil-Saint-Denis and Hutchinson, Paris, both of, France

Filed Sep. 15, 1989, Ser. No. 407,954
Claims priority, application France, Sep. 16, 1988, 88 12149
Int. Cl.[5] F28F *9/00*; F16L *39/02*
U.S. Cl. 165—76 17 Claims



1. In a rapid action coupling system for simultaneously coupling a fluid inlet chamber and a fluid outlet chamber to an extended circuit; a heat exchanger fluid tank with a fluid inlet chamber and a fluid outlet chamber (6,7) formed therein and separated from one another by a partition (8), a collector (2) along said fluid tank, said partition having one free edge (9) cooperating in a sealed manner with the collector (2) to define the two chambers, two necks on said fluid tank, one inner neck (11) and one outer neck (12) substantially surrounding the inner neck, the necks defining two fluid passages, respectively an inner and an outer passage, which communicate respectively with the two chambers, said partition including a planar portion (8c) extending in the longitudinal direction of the fluid tank, the inner neck being joined directly to the planar portion, and a coupling device (15), cast en bloc and provided with two necks (16, 17) arranged to cooperate with the inner and outer necks of the fluid tank, respectively; said longitudinal planar portion of the partition being joined to at least one transverse portion of the partition which divides the fluid tank longitudinally.

4,977,955

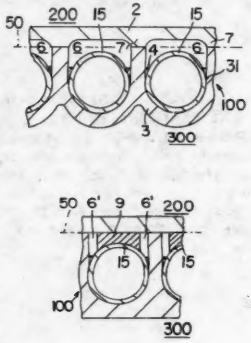
HEAT-TRANSFER WALL COMPOSED OF TWO PLATE-LIKE PARTS

Sandro Schweizer, Wiesendangen, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

PCT No. PCT/EP88/00683, § 371 Date Mar. 30, 1989, § 102(e) Date Mar. 30, 1989, PCT Pub. No. WO89/01122, PCT Pub. Date Feb. 9, 1989
PCT Filed Jul. 28, 1988, Ser. No. 346,944
Claims priority, application Switzerland, Aug. 4, 1987, 2987/87
Int. Cl.[5] F28F *3/12*
U.S. Cl. 165—170 13 Claims

1. A heat transfer wall comprising
a first plate-like heat conductive part having a plurality of parallel webs defining a plurality of parallel cutouts therebetween;
a plurality of parallel tubes for conducting a coolant there-

through; each said tube being disposed within a respective cutout in heat-conductive contact with said first part; and



a second plate-like heat conductive part secured to said first part along an interface disposed outside an outer contour of said tubes.

4,977,956

HEAT EXCHANGER

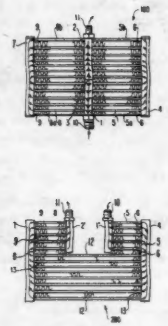
Hisao Aoki, Maebashi, and Toru Yamaguchi, Isesaki, both of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Jul. 11, 1989, Ser. No. 378,002

Claims priority, application Japan, Jul. 11, 1988, 63-90911[U]

Int. Cl.[5] F28F *9/02*

U.S. Cl. 165—176 **5 Claims**



1. A heat exchanger comprising:

a first header having a first union joint disposed on one end;

a second header having a second union joint disposed on one end;

at least two intermediate headers disposed laterally on opposite sides of both said first and second headers;

a plurality of fluid tubes disposed between said first header and at least a first of said intermediate headers to link said first header and at least said first intermediate header in fluid communication, and a plurality of tubes disposed between said second header and at least a second of said intermediate headers to link said second header and at least said second intermediate header in fluid communication; and

a plurality of corrugated fins disposed between opposed outer surfaces of said fluid tubes.

4,977,957

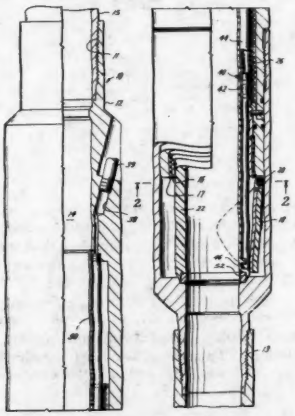
SUBSURFACE WELL SAFETY VALVE WITH LIGHT WEIGHT COMPONENTS

Ronald E. Pringle, Houston, Tex., assignor to Camco International Inc., Houston, Tex.

Filed Oct. 2, 1989, Ser. No. 415,677

Int. Cl.[5] E21B *34/10*

U.S. Cl. 166—321 **12 Claims**



1. A subsurface well safety valve for controlling the fluid flow through a well conduit comprising,

a housing having an axial bore therethrough,

valve seat positioned in the housing,

a valve closure member movable between open and closed positions relative to the valve seat,

a flow tube telescopically movable in the housing for controlling the movement of the valve closure member, said flow tube being made of a material having a density lesser than that of the housing,

biasing means in the housing acting on the flow tube for moving the valve to a closed position,

hydraulic piston and cylinder means in the housing actuating the flow tube, and

said flow tube being of a material having a density of substantially less than 0.3 pounds/cubic inch for requiring less force from the biasing means to close said valve.

4,977,958

DOWNHOLE PUMP FILTER

Stanley J. Miller, Rt. 2, Box 13, Skiatook, Okla. 74070

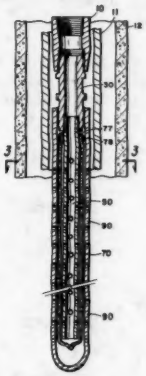
Continuation of Ser. No. 385,905, Jul. 26, 1989. This application Jun. 21, 1990, Ser. No. 541,622

Int. Cl.[5] E21B *43/00*

U.S. Cl. 166—205 **13 Claims**

9. For use in filtering sand and other solid particles from well fluids prior to passage of the fluids through a pump intake nut of a well pump, the intake nut having internal threads on a lower portion thereof, the combination with the pump intake nut of a cylindrical coupling having external threads on an upper end thereof and on a lower end thereof, said upper external threads of said coupling being rotationally engaged with said lower internal threads on the intake nut, a tubular member having an upper end coaxially secured within said coupling lower end and having a plurality of perforations dispersed at least along the lower portion thereof, a filtering means encasing the portion of said tubular member in which said perforations are dispersed for blocking sand or other particles from entry into said tubular member perforations, a cylindrical casing having a closed lower end and internal threads on an upper end thereof, said casing internal threads being rotationally secured to said coupling lower external

threads with said tubular member and said filtering means disposed within said casing, said casing having a plurality of perforations dispersed along the length thereof for blocking



larger sand or solid particles from entry into said casing, said casing perforations, said filtering means, said tubular member perforations, said coupling and said intake nut sequentially communicating to form a flow path for the well fluid.

4,977,959

METHOD OF POSITIONING OF PLUGS OR SCREENS BY HORIZONTAL DRILLING

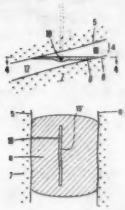
Jean Combe, Bougival, France, assignor to Institut Francais du Petrole, Rueil Malmaison, France

Continuation of Ser. No. 672,189, Nov. 16, 1984, abandoned. This application Jun. 5, 1986, Ser. No. 870,808

Claims priority, application France, Nov. 18, 1983, 83 18354

Int. Cl.[5] E21B *43/16*

U.S. Cl. 166—274 11 Claims



1. A method for positioning at least one plug or screen at a longitudinal interface between two different fluids in a geological formation, said interface having an oblong shape, which comprises injecting a fluid product intended to form said plug or screen which extends into the formation through injection means including at least one substantially horizontal drain member, said injection being effected through said at least one substantially horizontal drain member disposed in the vicinity of the interface formed by said two different fluids; and in order to provide a separation surface having an oblong shape, said at least one substantially horizontal drain member being disposed substantially along the main axis of said separation surface; said at least one substantially horizontal drain member having perforations along its length for distributing the fluid product evenly and slowly into the fluid to be produced and forming said at least one plug or screen along said interface whereby the two different fluids are essentially separated from each other.

4,977,960

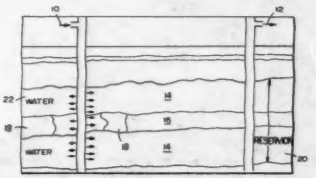
SODIUM HYDROXIDE TREATMENT OF FIELD WATER IN A BIOPOLYMER COMPLEX

Craig H. Phelps; Krishnaswamy Sampath, both of Carrollton, Tex., and Paul Shu, West Windsor, N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 53,443, May 22, 1987, abandoned, which is a continuation of Ser. No. 767,571, Aug. 20, 1985, Pat. No. 4,667,741. This application Nov. 23, 1988, Ser. No. 275,460

Int. Cl.[5] E21B *43/22*

U.S. Cl. 166—274 18 Claims



18. A waterflood method for recovering hydrocarbonaceous fluids from an oil reservoir which has zones of varying permeability and which formation is penetrated by an injection and a production well comprising:

(a) first mixing into water a substantially small amount of an alkali or alkaline earth metal hydroxide sufficient to cause gelation within a substantially effective time period where said hydroxide is contained in an aqueous solution in an amount of from about 1 to about 500 ppm;

(b) thereafter placing into said solution a water thickening amount of a water soluble Xanthomonas biopolysaccharide; and

(c) complexing subsequently said biopolysaccharide with an amount of a water-soluble compound of a polyvalent metal ion selected from the group consisting of trivalent phosphorus, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, copper, aluminum, arsenic, yttrium, zirconium, niobium, cadmium, tin, antimony, lanthanum, hafnium, tantalum, lead, and mixtures thereof, sufficient to cause substantially quicker gelation of said water soluble biopolysaccharide thereby forming a substantially more stable gel sufficient for use as a mobility or profile control medium in environments having low pH brines wherein said water soluble compound is added to said aqueous solution in an amount of from about 10 to about 1,000 ppm of the active polyvalent metal ion.

(d) injecting said stable gel into said reservoir via said injection well; and

(e) thereafter injecting water as a drive fluid behind said stable gel and recovering hydrocarbonaceous fluids.

4,977,961

METHOD TO CREATE PARALLEL VERTICAL FRACTURES IN INCLINED WELLBORES

Jitendra M. Avasthi, Brea, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Aug. 16, 1989, Ser. No. 394,610

Int. Cl.[5] E21B *43/26*

U.S. Cl. 166—297 4 Claims

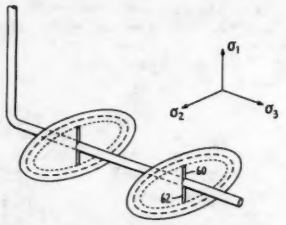
3. A method of recovering hydrocarbons from a subterranean formation comprising the steps of:

(a) determining the magnitude and orientation of principal in situ stresses in the subterranean formation;

(b) drilling and casing a wellbore in the direction of the determined minimum horizontal in situ stress;

(c) perforating the casing at a first perforation point in the vertical plane of maximum horizontal stress with a pair of perforations selectively located at opposing points within the casing circumference wherein the perforations are phased at 0° and 180°, where 0° is the uppermost point and 180° is the bottommost point on the wellbore circumference in the vertical plane;

(d) perforating the casing at a second perforation point in the plane of maximum horizontal stress with a second pair of perforations selectively placed at opposing points within



the casing circumference wherein the second perforations are phased at 0° and 180°, where 0° is the uppermost point and 180° is the bottommost point on the wellbore circumference in the vertical plane;

(e) applying hydraulic pressure to the cased wellbore sufficient to propagate the fractures at the first and second perforation point into the formation in the plane perpendicular to the minimum horizontal in situ stress; and

(f) producing to the surface formation fluids which enter the wellbore through at least the first and second perforations in the wellbore casing.

4,977,962

FLUID ADDITIVE AND METHOD FOR TREATMENT OF SUBTERRANEAN FORMATIONS

Ronald E. Himes, and David E. Simon, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Mar. 28, 1989, Ser. No. 330,232

Int. Cl.[5] E21B *43/22, 43/26*

U.S. Cl. 166—305.1 **4 Claims**

1. A method of removing a polysaccharide adsorbed on a clay contained in a subterranean formation comprising:

injecting an aqueous treatment fluid into a subterranean formation, said fluid including at least about 0.05 percent by weight of a fluid additive comprising at least one member selected from the group of tetraalkylammonium halides wherein the alkyl group is selected from methyl, ethyl, propyl and butyl radicals and trimethylammonium halide and maintaining said treatment fluid within said subterranean formation and in contact with said clay for a sufficient time to remove at least a portion of the adsorbed polysaccharide from the clay.

4,977,963

PARTIALLY CONCEALED FAST RESPONSE SPRINKLER HEAD

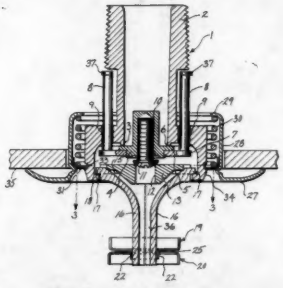
John R. Simons, Greendale, Wis., assignor to Star Sprinkler Corporation, Milwaukee, Wis.

Filed Apr. 10, 1989, Ser. No. 335,749

Int. Cl.[5] A62C *37/08*

U.S. Cl. 169—37 **8 Claims**

8. A partially concealed fast response sprinkler head, comprising a body having an inlet to be connected to a water line and having an outlet, valve means to enclose said outlet, said body having an internal shoulder, a pair of lever members each having an upper end supported on said internal shoulder, each lever member being generally semi-circular in cross section and the lower ends of said members being in mating relation to define a passage therebetween, connecting means interconnecting said valve means and said lever members for urging the lower ends of the lever members in a direction away from each other, releasable means including a mass of fusible metal interconnecting said lower ends and preventing movement of said lower ends in said direction, adjustable means disposed coaxially of said valve means and extending downwardly therefrom, said adjustable means being mounted for axial movement relative to said valve means, the lower end of said adjustable means being disposed in engagement with said connecting means



whereby downward movement of said adjusting means exerts a force through said connecting means against said lever members to urge said lever members in said direction, said connecting means having an opening aligned with the passage between said lever members and said adjustable means being exposed through said passage, whereby a tool can be inserted through said passage and through said opening and into engagement with said adjustable means, exposure of said fusible metal to an elevated temperature acting to melt said metal and release said releasable means to thereby disengage said lever members from said body and open said valve means.

4,977,964

RESILIENT PLANAR FRAMEWORK FOR SUPPORTING MULTIPLE GROUNDWORKING TOOLS

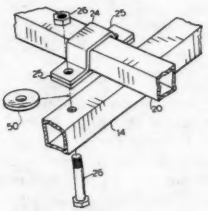
Terrance Friggstad, and David R. Hundeby, both of Saskatoon, Canada, assignors to Flexi-Coil Limited, Saskatoon, Canada

Division of Ser. No. 155,516, Feb. 12, 1988, Pat. No. 4,840,233.

This application Apr. 24, 1989, Ser. No. 341,847

Int. Cl.[5] A01B *23/04*

U.S. Cl. 172—310 **15 Claims**



8. A framework carrying the ground-working tools of a farm implement comprising at least one substantially planar horizontal section of interconnected structural members wherein each section comprises:

(1) a plurality of interconnected rigid tool mount members having an orientation generally transverse to the direction of travel when working, and

(2) a plurality of flexibly interconnecting links between said tool mount members transmitting, between said tool mount members, torsional stress of said tool mount members around axes generally transverse to the direction of travel, wherein:

(a) said flexibly interconnecting links provide for flexibility substantially only about axes generally parallel to the direction of travel of the implement, and,

(b) said interconnecting links provide for limited to zero flexibility about other axes, to relieve stress in the framework.

4,977,965

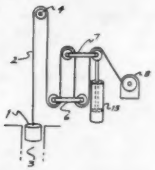
AUTOMATIC DROP HAMMER SYSTEM

Robert E. Rupe, 225 S. Bent Ave., San Marcos, Calif. 92069

Filed Aug. 4, 1989, Ser. No. 389,516

Int. Cl.[5] B25D *9/00*

U.S. Cl. 173—81 **21 Claims**



1. A hammering device which comprises:

a drop-weight;

a line attached to the weight;

means for vertically pulling the line to lift the drop-weight;

means for releasing the line to drop the drop-weight when the drop-weight has been lifted to a specified height above the last dropped position of the hammer;

means for taking ups slack in the line after the drop-weight has been dropped;

means for coupling said means for vertically pulling and said means for taking up slack;

electromechanical means for controlling and sequentially operating said various means;

wherein:

said means for coupling comprises at least one pulley block having at least one sheave;

said means for taking up slack in the line comprises:

a winch coupled to the line,

said line engaging said pulley block,

means for operating the winch to draw and hold said line taut, and

means for preventing the winch from lifting the drop-weight;

the means for vertically pulling the line comprises:

a hydraulic cylinder, said cylinder coupled to the line, means for fixing the end of the line,

and means for preventing the winch from lifting the drop-weight.

4,977,966

SEAWATER HYDRAULIC ROTARY IMPACT TOOL

Bruce Farber, Oak View; John Kunsemiller, and Scott Barradas, both of Oxnard, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 30, 1990, Ser. No. 502,594

Int. Cl.[5] B23Q *5/00*

U.S. Cl. 173—159 **20 Claims**

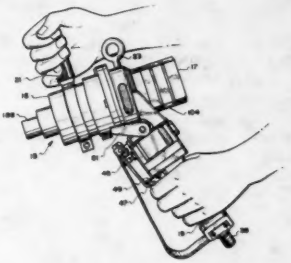
1. A rotary impact tool which uses pressurized seawater as the operating fluid comprising:

a housing;

a seawater powered vane motor mounted on said housing, said seawater powered vane motor having a shaft journalled within said housing and rotated by seawater under pressure, and at least one forward inlet-reverse outlet port and at least one reverse inlet-forward outlet port;

control means having a trigger, the trigger of said control means when engaged allowing pressurized seawater to pass through said control means to said seawater powered vane motor so as to rotate the shaft of said vane motor;

means for directing pressurized seawater to the forward inlet-reverse outlet port of said seawater powered vane motor such that when said trigger is engaged the shaft of



said motor rotates in a forward direction or to the reverse inlet-forward outlet port of said seawater powered vane motor such that when said trigger is engaged the shaft of said motor will rotate in a reverse direction;

a rotary impact mechanism mounted in the front portion of said housing and having a tool engaging element protruding from said housing; and

means mounted within said housing for coupling the shaft of said seawater powered vane motor to said impact mechanism so as to transmit the rotating motion of the shaft of said motor to said impact mechanism.

4,977,967

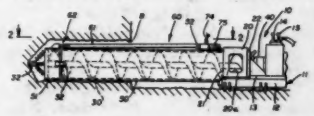
STEERING AND LUBRICATING APPARATUS FOR PORTABLE EARTH BORING MACHINE WITH STEERING HEAD

Howard W. Alston, Chagrin Falls; Ronald E. Peacock, West Salem, and Douglas G. Schondell, Ashland, all of Ohio, assignors to Augers Unlimited, Inc., Ashland, Ohio

Filed Sep. 22, 1989, Ser. No. 411,564

Int. Cl.[5] E21C *1/10*

U.S. Cl. 175—45 **14 Claims**



1. Combined steering and lubricating apparatus for use with an earth boring apparatus of the type that forms horizontal holes and pushes sections of casings into said holes, comprising:

(a) a casing section;

(b) a casing extension pivotally attached to one end of said casing;

(c) pivot means connecting said casing to said casing extension for pivoting said casing extension relatively of said casing;

(d) control means mounted on the exterior of said casing adjacent the opposed end thereof and connected to said pivot means;

(e) said control means being adapted for releasable connection with a source of fluid;

(f) said pivot means being in fluid communication with said control means and the exterior of said casing whereby fluid may be deposited on the exterior of said casing adjacent its point of attachment to said casing extension; and

(g) said pivot means and said control means being interconnected by an elongate hollow tube and releasably connected to opposed ends thereof by hollow first and second connectors in fluid communication with the interior of said tube.

4,977,968

CLEANING DEVICE FOR WEIGHING MACHINES, IN PARTICULAR COMBINATION WEIGHING MACHINES

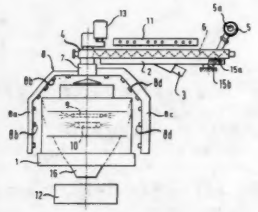
Wilhelm L. Krämer, Hans-Watzlikweg 10, 8264, Waldkraiburg, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 389,234

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826399

Int. Cl.[5] G01G *23/00, 13/16*

U.S. Cl. 177—245 **33 Claims**



1. A cleaning device adapted for use with a weighing machine having a process control for monitoring and controlling the weighing machine while the weighing machine is not conducting weighing operation, the cleaning device comprising:

means for activating the process control subsequent to normal weighing operations of said weighing machine;

means for receiving cleaning signals from the process control; and

means responsive to the cleaning signals for cleaning the weighing machine.

4,977,969

WEIGHING APPARATUS WITH CALIBRATION WEIGHT MEANS

Roger Leisinger, Zürich, and Erwin Meixner, Volkertswil, both of Switzerland, assignors to Mettler Instrumente AG, Greifensee, Switzerland

Filed Oct. 11, 1989, Ser. No. 420,118

Claims priority, application Switzerland, Nov. 8, 1988, 4147/88

Int. Cl.[5] G01G *19/52*; G01L *25/00*

U.S. Cl. 177—50 **11 Claims**

1. Electronic weighing apparatus comprising:

(a) a frame (9);

(b) load receiving means (15) connected for vertical movement relative to said frame;

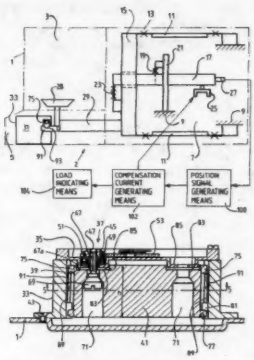
(c) a calibration weight (41);

(d) means for connecting and disconnecting said calibration weight relative to said load receiving means, respectively, said connecting and disconnecting means including:

(1) a calibration weight housing (33) connected with said frame adjacent said load receiving means, said housing containing a chamber in which said calibration weight is arranged, said housing including a cover portion (35) defining the upper wall of said chamber and containing therein at least one vertical through passage;

(2) an internally-threaded vertical sleeve (45) rotatably mounted in said through passage;

(3) lifting screw means (67) threadably connected at its



upper end with said sleeve and connected at its lower end with said calibration weight; and

(4) drive means including a motor (57) for alternately rotating said sleeve to raise and lower said lifting screw and said calibration weight relative to said load receiving means, respectively.

4,977,970

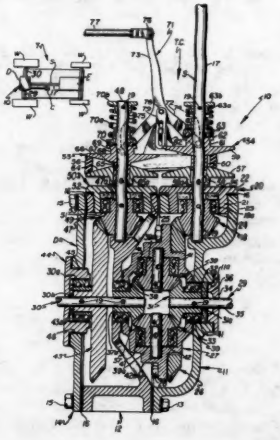
DIFFERENTIAL DRIVE AND STEERING SYSTEM

Maurice J. Steiger, 1404 Birchland Dr., Thief River Falls, Minn. 56701

Filed Feb. 12, 1990, Ser. No. 479,420

Int. Cl.[5] B62D *11/06*

U.S. Cl. 180—6.2 **7 Claims**



1. A differential drive and steering system for a vehicle, comprising:

a differential drive including a housing structure, an input shaft and a pair of output shafts mounted on said housing structure, differential gear means drivingly interconnecting said input shaft with said ouput shafts whereby, when the input shaft is revolved, said output shafts may be

revolved with the same angular velocity with respect to each other or may be revolved differentially,

a torque converter including a transmission shaft revolvably mounted on said housing structure,

meshing gear means on said transmission shaft and one of said output shafts,

a speed control shaft journaled on said housing structure,

a planetary gear mechanism drivingly interconnecting said speed control shaft and said transmission shaft, and drive transmitting means mechanically interconnecting said input shaft with said planetary gear mechanism, and

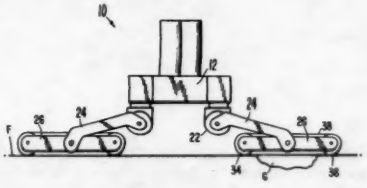
a pair of variable pitch pulleys, one of which is mounted on said input shaft, and the other pulley being mounted on said speed control shaft, an endless belt trained about said pulleys, control means for variously and selectively varying the pitch of said pulleys from a neutral position, wherein said power input and speed control shafts are revolved at the same angular velocity, to positions wherein one of the power input and speed control shafts is driven at a different angular velocity than the other of said power input and speed control shafts to thereby permit wide radius turns and pivot turns by selectively adjusting the pitch on said pulleys.

4,977,971

HYBRID ROBOTIC VEHICLE

Carl D. Crane, III, Gainesville, Fla., and Dana S. Haukoos, Fountain Valley, Calif., assignors to University of Florida, Gainesville, Fla.

Filed May 17, 1989, Ser. No. 353,027
Int. Cl.[5] B62D *63/02, 55/075*
U.S. Cl. 180—8.3 **25 Claims**



1. A hybrid robotic vehicle comprising:

a main body;

a plurality of legs, each of said plurality of legs (1) comprising a strut assembly having a proximal end and a distal end, said proximal end being pivotable about a first horizontal axis independently of rotation of a wheel, and wherein a track assembly on each of said legs is pivotably connected to said distal end of said strut assembly, and (2) being operatively connected to said main body and being pivotable about a vertical axis with respect to said main body;

means for selectively operating said vehicle in a wheeled mode, in a tracked mode, or in a legged mode, wherein each of said plurality of legs further comprises a wheel assembly and a track assembly, and wherein said wheel assembly on each of said plurality of legs has driven means for rotating said wheel about said first horizontal axis; and

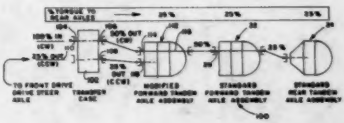
said track assembly on each of said plurality of legs has drive means for driving said track, said track assembly further being pivotable about a second horizontal axis spaced apart at a predetermined distance from said first horizontal axis.

4,977,972

TRIDEM DRIVE AXLE SYSTEM

Bradford W. Hicks, Kalamazoo, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 3, 1989, Ser. No. 292,677
Int. Cl.[5] B60K *17/16*
U.S. Cl. 180—24.04 **8 Claims**



1. A front-rear drive axle assembly (112) for a multiple rear drive axle system (100) comprising at least a front-rear, a middle-rear and a rear-rear drive axle assembly, said front-rear drive axle assembly comprising a housing (120), a drive gear set (122,124) and a first input shaft (118) rotatably supported in and extending forwardly from said housing in driving connection with said drive gear set;

said front rear drive axle assembly characterized by;

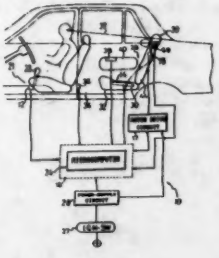
a second input shaft (114) rotatably supported in and extending forwardly from said housing and drivingly connected to an output shaft (116) rotatably supported in said housing and extending rearwardly therefrom, said second input shaft and said output shaft noncoaxial with and independently rotatable relative to said first input shaft.

4,977,973

HEADREST CONTROL DEVICE AND HEADREST DRIVE MECHANISM FOR USE IN AN AUTOMOTIVE SEAT

Kiyotaka Takizawa, Akishima, Japan, assignor to TACHI-S Co., Ltd., Tokyo, Japan

Filed Jul. 31, 1989, Ser. No. 386,922
Claims priority, application Japan, Aug. 24, 1988, 63-210046
Int. Cl.[5] B60R *21/055*
U.S. Cl. 180—271 **5 Claims**



1. A method for use with an automotive rear seat having an upwardly projecting headrest, and a headrest control device comprising a headrest control system in linkage with a gear change, said method comprising the steps of:

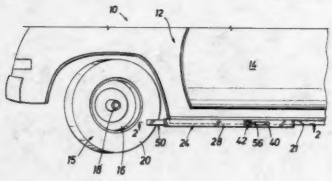
detecting the absence of an occupant in said rear seat; and, when absence is detected and upon shifting gears to reverse, rotating forwardly and downwardly said headrest of said rear seat from an upright head support position to a storage position below the backward visual field line of a driver to thereby secure the backward visual field of said driver in backing a car; and

detecting the opening of a rear door; and, when said rear door is opened, returning said headrest from the storage position thereof to the head support position thereof.

4,977,974
LOCKING DEVICE FOR AUTOMOBILES

Edward E. Brown, 2438 Catacombs, New Caney, Tex. 77357

Filed Jan. 9, 1989, Ser. No. 294,789
Int. Cl.[5] B60R 25/02
U.S. Cl. 70—226 5 Claims



1. A releasable securing device for holding an automobile front wheel including a tire thereon in a turned position to prevent steering of the automobile by contact with a side of the tire and adapted to be mounted on the automobile frame adjacent the wheel; said releasable securing device comprising;

an elongate support secured to the automobile frame subjacent a front door thereof;

an elongate securing bar mounted on said elongate support for relative sliding movement between a retracted inoperable position out of contact with said tire and an extended operable position alongside a side of the tire after the wheel is turned a predetermined amount from a straight forward direction thereby to block return of the wheel to a straight position; and

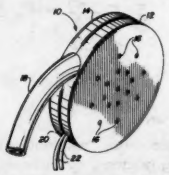
manually operable means to releasable secure the securing bar in extended position alongside a side of the front wheel thereby to prevent normal movement of the automobile in a straight direction;

said elongate support being a tubular member receiving said elongate securing bar in telescoping relation and having a longitudinally extending elongate slot therein, said securing bar having a detent projecting therefrom and received within said slot for relative sliding movement between retracted and extended positions of said securing bar.

4,977,975
VENTED MOTORCYCLE HELMET SPEAKER ENCLOSURE

John J. Lazzeroni, and Melinda K. Lazzeroni, both of 7322 E. Stella Rd., Tucson, Ariz. 85730

Filed Sep. 14, 1989, Ser. No. 407,297
Int. Cl.[5] H05K 5/00; H04R 25/00
U.S. Cl. 181—129 18 Claims



1. A speaker enclosure for use in motorcycle helmets for preventing mixing of parasitic sound waves with primary sound waves issuing from the speaker enclosure, the speaker enclosure comprising:

a first and second cup-shaped housing assembly, said first and second housing assembly joined together to form an enclosure, each said housing assemblies having a flat circular face;

an audio loudspeaker secured interiorly to said first cup-shaped housing assembly, said loudspeaker having a front output side and a rear output side, primary sound waves issuing from said loudspeaker front output side and parasitic sound waves issuing from said loudspeaker rear output side;

a plurality of first openings through said circular face of said first cup-shaped housing assembly proximate said loudspeaker front output side to permit emergence of primary sound waves;

a rear chamber interiorly to said enclosure rearward of said loudspeaker rear output side, said rear chamber excluding said loudspeaker front output side;

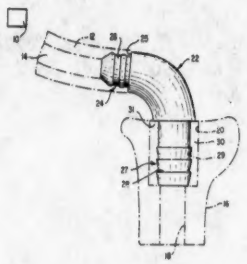
a second opening through said enclusure, said second opening providing open communication between said rear chamber and outside said enclosure; and

a venting tube exteriorly to said enclosure, said venting tube operably attached to said enclosure second opening communicating with said rear chamber, said venting tube receiving for conveying away parasitic sound waves emanating from said loudspeaker rear output to a desired location whereby the parasitic sound waves issuing from said enclosure rear chamber are conveyed away to prevent mixing with the primary sound waves issuing from said first openings of said enclosure first housing assembly circular face.

4,977,976
CONNECTOR FOR HEARING AIR EARMOLD

Miklos Major, Ambridge, Pa., assignor to Microsonic, Inc., Ambridge, Pa.

Filed Sep. 27, 1988, Ser. No. 250,016
Int. Cl.[5] H04R 25/02
U.S. Cl. 181—130 5 Claims



1. A connector for connecting sound conduction tubing from a hearing aid to a sound conduction bore of an earmold comprising:

an elbow shaped member having a tubing receiving section and an earmold connection section;

said elbow shaped member having a single internal unobstructed sound transmitting bore between said tubing receiving section and said earmold connection section, said sound transmitting bore having a diameter which increases from a first diameter portion at said tubing receiving section to a second diameter portion at said earmold connection section.

4,977,977
MARINE ENGINE EXTERNAL EXHAUST NOISE SUPPRESSOR WITH SWIM PLATFORM

George Von Widmann, Port St. Lucie, and Robert V. Parenti, Stuart, both of Fla., assignors to Delta Aero Flow Inc., Stuart, Fla.

Continuation-in-part of Ser. No. 208,068, Jun. 17, 1988, abandoned. This application Apr. 5, 1989, Ser. No. 363,969
Int. Cl.[5] B63H 21/32; F01N 7/12
U.S. Cl. 181—235 8 Claims

1. An exhaust muffler device for a motor boat having a centerline, two sides and a transom with an exhaust pipe passing engine exhaust gas through a port half of the transom and

an exhaust pipe passing engine exhaust gas through a starboard half of the transom, said muffler device comprising:

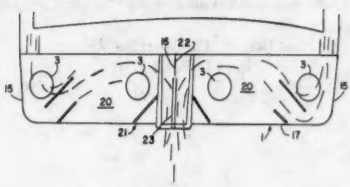
(a) a lateral sidewall adjacent one of said sides of said boat and having a leading edge for attachment to said transom;

(b) a central sidewall adjacent said centerline of said boat and having a leading edge for attachment to said transom;

(c) a top extending between the two sidewalls and forming a swimming platform and having a leading edge for attachment to said transom;

(d) a bottom extending between the two sidewalls and having a leading edge for attachment to said transom;

(e) a rear wall extending from said top to said bottom between said sidewalls;



(f) an upper exhaust port means in said rear wall adjacent said central sidewall and said top;

(g) a lower exhaust port means in said rear wall adjacent said central sidewall and said bottom;

(h) said bottom generally sloping upward from said leading edge to said rear wall except at said lower exhaust port means wherein the slop is reversed to provide drainage and for discharging said exhaust gas at a low level;

(i) said sidewalls, said top and said bottom defining an acoustic chamber when said leading edges are sealingly connected to one half of said transom thereby enclosing said exhaust pipe and providing a tortuous path for said exhaust gas for noise reduction and to direct said gas away from said boat.

4,977,978

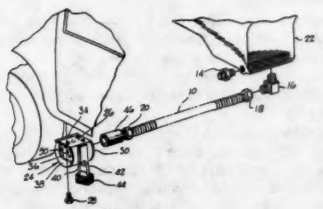
AUTOMOTIVE OIL CHANGE APPARATUS

Mazen P. Batrice, 6610 Norfolk Ave., Lubbock, Tex. 79413

Filed Jul. 31, 1989, Ser. No. 386,610

Int. Cl.[5] F16N *33/00*

U.S. Cl. 184—1.5 **2 Claims**



1. Oil change apparatus for use in changing the motor oil in a motor vehicle, the apparatus comprising:

housing means fixedly mounted on the underside of one of left and right edges of the motor vehicle, directly rearward of a corresponding one of left and right front wheels of the motor vehicle, and in substantially direct alignment with an oil drain plug on an engine oil pan of the motor vehicle;

an oil discharge valve removably mounted within said housing means, said oil discharge valve comprising a generally cylindrical valve housing, a valve member adapted for sliding motion within said valve housing between an open position and a closed position, and spring means within said valve housing urging said valve member into said closed position; and

a flexible steel line coupling said oil discharge valve to the engine oil pan of said motor vehicle;

said housing means including a locking hinged member covering said oil discharge valve to thereby prevent access thereto when said locking hinged member is in a locked position and permitting access to said oil discharge valve when said locking hinged member is in an unlocked position.

4,977,979

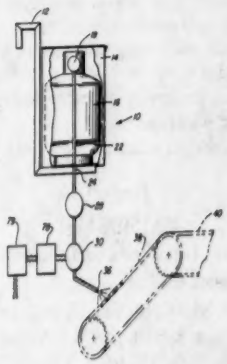
LUBRICATION SYSTEM

James L. King, Sr.; James L. King, Jr., both of Rock Falls, and John Pope, Sterling, all of Ill., assignors to Sauk Valley Equipment Company, Rock Falls, Ill.

Filed Mar. 28, 1989, Ser. No. 329,562

Int. Cl.[5] F16N *7/34*

U.S. Cl. 184—15.1 **15 Claims**



1. A system for the lubrication of a drive chain of a conveyor comprising:

a container precharged with pressurized air and at least partially filled with lubricant, said container including an outlet for said lubricant;

a pressure regulator connected to said container outlet regulating the actual pressure of the lubricant in the container and the discharge pressure of the lubricant;

a conduit for the flow of lubricant connected to said pressure regulator;

an adjustable needle valve connected to said conduit for regulating the flow of lubricant;

a solenoid valve connected to said conduit downstream of said needle valve for controlling the flow of lubricant; and

means downstream of said solenoid valve for dispensing said lubricant onto said drive chain.

4,977,980

INDIRECT-PLUNGER HYDRAULIC ELEVATOR

Fujita Hifumi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed May 13, 1988, Ser. No. 193,655

Claims priority, application Japan, May 14, 1987, 62-72167[U]

Int. Cl.[5] B66B *7/08*

U.S. Cl. 187—1 R **3 Claims**

1. An indirect-plunger hydraulic elevator comprising:

a car enclosure;

a car frame, fixed on the outerside of said car enclosure, for supporting said car enclosure including:

a top beam;

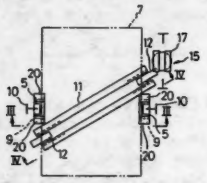
right and left vertical frames fixed to said top beam and having lower end portions;

a plurality of bracing members, each bracing member fixed to one of said lower end portion of said vertical frames; and

a car platform supporting frame, fixed to said bracing members, for supporting said car enclosure;

safety devices connected to said bracing members;

an elevator lifting sheave supporting beam fixed directly on a lower surface of said car platform supporting frame so as not to interfere with said bracing members and safety devices;



a pair of elevator lifting sheaves rotatably attached at both ends of said sheave supporting beam;

a wire rope disposed along said pair of elevator lifting sheaves; and

a hydraulic jack for moving said car enclosure up and down through said wire rope.

4,977,981

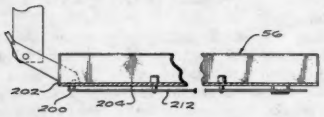
WAYSIDE LIFT

Gregory J. Paquin, Los Angeles, Calif., assignor to Ricon Corporation, Pacoima, Calif.

Division of Ser. No. 142,040, Jan. 11, 1988, abandoned. This application Apr. 10, 1989, Ser. No. 335,331

Int. Cl.[5] B66B *1/00*

U.S. Cl. 187—41 **2 Claims**



1. A lift disabling device for a lift apparatus having a platform for supporting an object, the platform having a bottom, the lift having a lift movement means for moving the platform between a lowered position adjacent a landing and a raised position, the lift disabling device comprising:

a plurality of platform supports extending a first distance from the bottom of the platform at isolated spaced locations for contacting the landing and supporting the platform against the landing when the platform is in the lowered position;

a safety plate spaced a second distance below the platform bottom and positioned to cover a substantial portion of the surface area of the platform bottom but in non-contacting relationship to the platform supports, the first distance being greater than the second distance so that the platform supports prevent the safety plate from contacting the landing when the platform is in the lowered position;

a plurality of switch means mounted to the bottom of the platform and attached to the safety plate, each switch means being responsive to movement of the safety plate toward the platform bottom, each switch means electrically coupled for disabling the lift movement means when the switch means is electrically switched in response to movement of the safety plate toward the platform bottom;

the platform further having a front region and a rear region, the plurality of platform supports comprising:

a support bar extending across the width of the platform bottom at the rear region of the platform;

a right front support post protruding from the platform bottom at a right location in the front region; and

a left front support post protruding from the platform bottom at a left location in the front region;

the safety plate having a right opening and a left opening therethrough aligned with the right and left front support posts so that the right and left front support posts extend through the right and left openings in the safety plate.

4,977,982

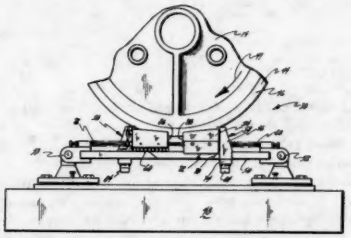
ELEVATOR SHEAVE BRAKE SAFETY

Louis Bialy, Simsbury; Anthony Cooney, Farmington; William Sheridan, Southington, and Edward Reiskin, West Hartford, all of Conn., assignors to Otis Elevator Company, Farmington, Conn.

Filed Dec. 26, 1989, Ser. No. 456,416

Int. Cl.[5] B66B *5/16*

U.S. Cl. 187—89 **31 Claims**



1. In an elevator system having a cable supported car, a cable supported counterweight, a cable drive sheave, and a cable connecting said car and said counterweight and passing over said sheave, a safety braking system comprising:

a brake ring on said sheave having a sheave braking surface comprising a pair of angularly disposed braking surfaces;

a first brake shoe having a first brake shoe braking surface comprised of a pair of angularly disposed braking surfaces;

one of said pair of angularly disposed braking surfaces being a V groove and the other being a wedge, each having substantially same included angle between the pair of braking surfaces;

a support for supporting and guiding said first shoe in a direction with said first shoe bearing surface moving tangential to the sheave bearing surface;

a first shoe load radial biasing means for resiliently biasing said shoe in said support substantially radially toward said brake ring;

a first shoe engagement biasing means for urging said shoe tangentially into engagement with said brake ring;

a first stop on said support for limiting travel of said first brake shoe at a location where said shoe braking surfaces and said sheave braking surfaces are in contact;

first shoe disengaging means for holding said first brake shoe against said first shoe engagement biasing means out of engagement with said brake ring;

a second brake shoe having a pair of second shoe braking surfaces complimentary to the pair of sheave braking surfaces;

second shoe biasing means for urging said second shoe into contact with said brake ring;

second shoe disablement means for holding said second shoe out of engagement with said brake ring;

said sheave rotating in a direction away from said first shoe when said car is moving in the up direction;

overspeed means for releasing said disengaging means on a detected overspeed in the upward direction; and

locking means for releasing both said first shoe disengaging

means and said second shoe disablement means on discrete movement of said car from a landing with the doors open.

4,977,983

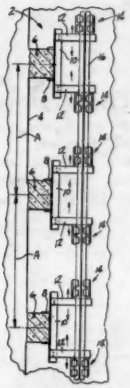
MOUNT SYSTEM FOR ELEVATOR GUIDE RAILS

Alfonso Garrido; Jose Sevilleja, and Julian Cabanas, all of Madrid, Spain, assignors to Otis Elevator Company, Farmington, Conn.

Filed Oct. 26, 1989, Ser. No. 427,055

Int. Cl.[5] B66B 7/02

U.S. Cl. 187—95 **3 Claims**



1. A mount assembly for elevator guide rails in an elevator hoistway which has spaced apart horizontal building structural beams therein, said mount assembly comprising:

(a) a basal beam connected to each structural beam and extending vertically in the hoistway, said basal beam including upper and lower ends thereof offset upwardly and downwardly of each structural beam respectively;

(b) elongated extension arms mounted on said upper and lower ends of said basal beam, said arms extending horizontally into the hoistway above and below each of the structural beams; and

(c) a guide rail mount assembly secured to each of said extension arms at an end thereof distal of said basal beam, said guide rail mount assemblies being operable to clip a guide rail in place in the hoistway, whereby there are at least two guide rail mount assemblies for each guide rail between each of the adjacent structural beams in the hoistway.

4,977,984

APPARATUS AND METHOD FOR DETECTING ELEVATOR CAR POSITION IN A DOOR ZONE

Hansjörg Arnosti, Horw, and Hans Bussmann, Ebikon, both of Switzerland, assignors to Inventio, Switzerland

Filed Aug. 21, 1989, Ser. No. 396,431

Claims priority, application Switzerland, Aug. 23, 1988, 3129/88

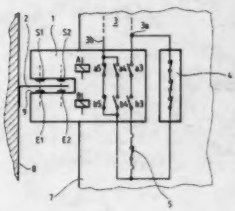
Int. Cl.[5] B66B 1/50

U.S. Cl. 187—134 **15 Claims**

1. A method for generating elevator car position information in an elevator shaft for connecting a plurality of door and lock contacts to a source of electrical power when the elevator car is in a door zone of a destination floor for stopping the elevator car, comprising the steps of:

a. providing an elevator car with a safety light barrier connected to a safety circuit, said safety circuit having a signal preparation circuit and a signal evaluation circuit including a pair of door safety relays, each said relay having a plurality of contacts actuated by the energization of an associated relay coil and connected in series with a plurality of door and lock contacts;

b. testing a function readiness and an associated function of said signal preparation circuit statically at every position of the elevator car in an associated elevator shaft and dynamically on passing of unserviced floors and on leveling in at a floor of destination by the elevator car, and upon sensing errors during said testing, generating at least two different error signals representing an error in the



function readiness and an error in the associated function; and

c. performing a simultaneity check in said signal evaluation circuit of shaped signals applied to inputs of said signal evaluation circuit by said signal preparation circuit on leveling in at a destination floor by starting a testing time upon a pull in of one of said door safety relays and preventing the other one of said door safety relays from pulling in after the expiration of the testing time whereby a premature opening of the elevator door is prevented.

4,977,985

METHOD OF CARRYING OUT MAINTENACE OF MULTI-DISC BRAKE ARRANGEMENT

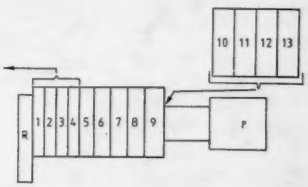
Trevor C. Wells, Leamington Spa, and Anthony J. Waring, Nuneaton, both of England, assignors to Dunlop Limited a British Company, United Kingdom

Filed Jun. 1, 1989, Ser. No. 360,159

Claims priority, application United Kingdom, Jun. 8, 1988, 8813518

Int. Cl.[5] F16D 55/36

U.S. Cl. 188—71.1 **6 Claims**



1. A method of carrying out the maintenance of a multi-disc brake of the kind comprising a stack of interleaved rotor and stator discs provided between a thrust device and a reaction member in an arrangement in which friction is generated between rubbing faces of adjacent rotor and stator discs, said method comprising:

selecting and arranging the rotor and stator discs so that the wear allowance of a set of discs at one end of the stack is less than the wear allowance of a set of discs at the other end of the stack;

removing a fully worn group of discs from said one end of the stack during a brake service operation following wear;

axially moving or shifting the remaining partially worn discs

of the stack to a new position towards said one end of the stack, and

adding an unworn group of discs to the other end of the stack.

4,977,986

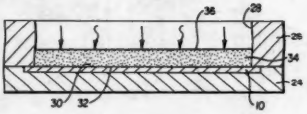
BONDING FRICTION MATERIAL TO PLATED SUBSTRATES

Keith R. Edwards, Lindsay, Canada, assignor to Abex Corporation, Newton, Mass.

Division of Ser. No. 348,045, May 5, 1989. This application Jan. 8, 1990, Ser. No. 461,616

Int. Cl.[5] F16D 69/04

U.S. Cl. 188—73.1 4 Claims



1. A vehicle brake shoe comprising a back plate having a zinc plate coating and a friction material preform in which the bottom surface of the preform engages the top surface of the back plate and an adhesive interposed between the bottom surface of the friction material preform and the top plated surface of the back plate which has been cured by a combination of heat and pressure to obtain an adequate strength bond of the preform to the back plate.

4,977,987

HYDRAULICALLY ACTUATABLE BRAKING APPARATUS, IN PARTICULAR FOR SPOT-TYPE DISC BRAKES

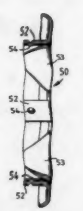
Herbert Schmidt, Frankfurt am Main; Erhard Czich, Eppstein, and Horst Höfner, Steinbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 12, 1987, Ser. No. 13,703

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1986, 3604613

Int. Cl.[5] F16D 65/78

U.S. Cl. 188—264 G 5 Claims



1. A hydraulically actuated braking apparatus for spot-type disc brakes, comprising a housing having a cylinder, a piston in said cylinder adapted to act on a brake pad, a metal ring mounted in a first groove on an outside surface of the piston and an elastic folded collar fastened in a second groove on said outside surface of said piston behind the metal ring, one end portion of said folded collar being mounted at the circumference of the piston and a second end of the collar being mounted at the circumference of the cylinder and a plurality of inwardly directed knobs radially distributed at an inside circumference of the metal ring on elastic ring elements, said ring elements being axially bent out of a radial plane, said knobs extending into said first groove of said piston thereby providing a connection with said groove of said piston to position said ring element in a defined axial position, and said metal ring partially embracing the folded collar.

4,977,988

CONTROL SYSTEM FOR A CLUTCH FOR A VEHICLE

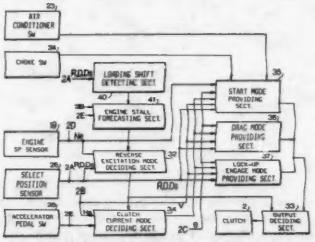
Hiroshi Tanaka, Musashino, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1989, Ser. No. 417,833

Claims priority, application Japan, Oct. 18, 1988, 63-262089

Int. Cl.[5] B60K 41/28

U.S. Cl. 192—0.052 4 Claims



4. A system for controlling an automatic clutch of a motor vehicle having a transmission for trasnsmitting power of an engine to a driving wheel of the vehicle, the clutch being engaged when vehicle speed is higher than a predetermined clutch engaging vehicle speed, a shift lever for selecting a forward driving range or a rearward driving range of said transmission, a shift position detector for detecting said ranges and for producing a forward driving range signal or a rearward driving range signal, respectively, an accelerator pedal position sensor for producing an accelerator pedal releasing signal when the accelerator pedal is released, and a vehicle speed detector for sensing vehicle speed and for producing a corresponding vehicle speed signal, the improvement of the system which comprises:

a loading shift detector responsive to change from said forward driving range signal to said rearward driving range signal or vise versa for producing a loading shift signal;

engine stall deciding means responsive to said loading shift signal, said accelerator pedal releasing signal and said vehicle speed signal for producing an engine stall signal when said vehicle speed is higher than said predetermined clutch engaging vehicle speed;

reverse excitation mode deciding means responsive to said engine stall signal for producing a reverse excitation signal to immediately release said clutch completely, so as to prevent engine stalling when said accelerator pedal is released for shifting from said forward driving range to said rearward driving range of visa versa while driving said vehicle at a higher speed than said predetermined clutch engaging vehicle speed.

4,977,989

DOG CLUTCH MECHANISM

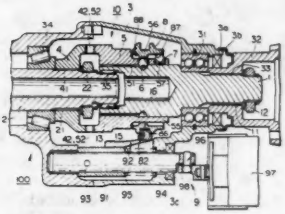
Noboru Ashikawa; Kazuhiko Shimada; Shoji Tokushima; Tetsurou Hamada; Naoya Akama; Masami Takano, and Makoto Watanabe, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1988, Ser. No. 212,431

Claims priority, application Japan, Jun. 30, 1987, 62-162620; Jul. 13, 1987, 62-107315[U]; Aug. 19, 1987, 62-205881

Int. Cl.[5] F16D 7/08

U.S. Cl. 192—56 R 17 Claims



1. A dog clutch mechanism comprising:

a case;

first and second rotatable shafts rotatably disposed coaxially in said case, said second rotatable shaft having an annular groove defined in an outer periphery thereof;

a dog piece fixedly mounted on said first rotatable shaft and having first dog teeth confronting an end of said second rotatable shaft;

a hub axially slidably mounted on said second rotatable shaft and having second dog teeth meshingly engageable with said first dog teeth, said second dog teeth being movable out of meshing engagement with said first dog teeth under a thrust force produced in response to relative torque transmission between said first and second rotatable shafts, said hub having first guide holes extending radially therethrough toward said second rotatable shaft;

a plurality of first balls retained respectively in said guide holes and engageable in said annular groove with said first and second dog teeth in meshing engagement; and

engaging means axially slidably disposed around an outer periphery of said hub and including a land for engaging said first balls and pressing the balls into said annular groove to maintain said first and second dog teeth in meshing engagement,

said hub having second guide holes spaced axially from said first guide holes, a plurality of second balls engaged in said second guide holes and held against said second shaft by said engaging means,

actuator means for sliding said engagement means on said first and second balls to release said land from said first balls and thereby enable said first balls to escape from said annular groove so that said hub can move relative to said second shaft and said second dog teeth on the hub can come out of meshing engagement with said first dog teeth,

said land being axially positioned between said first and second pluralities of balls when said first balls are out of said annular groove.

4,977,990

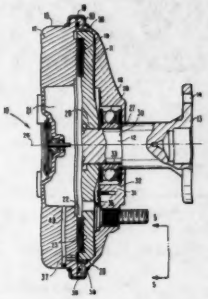
FREE FLOATING DAM FOR A FLUID SHEAR COUPLING APPARATUS

Gerald E. Mader, Indianapolis, Ind., assignor to Schwitzer U.S.A. Inc., Indianapolis, Ind.

Filed Sep. 29, 1989, Ser. No. 414,765

Int. Cl.[5] F16D 35/00

U.S. Cl. 192—58 B 19 Claims



1. A fluid shear coupling which comprises:

a driving member including a disc-shaped portion having a side defining a shear surface and having a cylindrical, outer perimeter;

a driven member including a shear fluid reservoir and defining a working chamber within which said driving member is received, the working chamber including a shear surface facing and adjacent to the shear surface of said driving member, the working chamber defining an annular groove facing the side of said driving member adjacent the outer perimeter of said driving member, the working chamber also defining a circumferential cavity facing the outer perimeter of said driving member, said driven member including a bearing housing, a cover, and coupling means for coupling the cover to the bearing housing;

mounting means for mounting said driven member to said driving member to be rotatable about a common axis;

a one-piece, L-shaped dam including a radially extending portion and an axially extending portion, the radially extending portion being received within the annular groove in the working chamber and having a surface facing and adjacent the side of said driving member, the axially extending portion being received within the circumferential cavity in the working chamber and having a surface facing and adjacent the outer perimeter of said driving member, each of the radially and axially extending portions including a first ramp surface at one end facing generally in a first direction and a second ramp surface at the opposite end facing generally in a second direction opposite to the first direction; and,

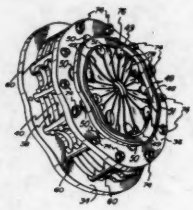
one of the bearing housing and the cover defining a fluid return passageway including a dump hole opening into the annular groove, the other of the bearing housing and cover defining a cavity within which is received said dam, the coupling means of said driven member being for selectively coupling the cover to the bearing housing with said dam having one of two alternative positions, the first position being in which the second ramp surfaces are located adjacent and facing the dump hole and the second position being in which the first ramp surfaces are located adjacent and facing the dump hole.

4,977,991

MULTIPLE DISC CLUTCH

Paul E. Mahoney, Harrisville, R.I., assignor to Delta Clutch, Inc., Providence, R.I.

Filed Aug. 28, 1989, Ser. No. 399,152
Int. Cl.[5] F16D 13/56, 13/68
U.S. Cl. 192—70.19 11 Claims



1. A multiple disc dowel activated clutch for use in transmitting torque from a torque source to a torque destination, comprising:

a support plate affixed to and spaced apart from said torque source;

a plurality of fixed dowels axially extending between and secured to said support plate and said torque source;

a driving plate located adjacent said support plate between said support plate and said torque source, said driving plate being provided with a plurality of apertures around an outer perimeter thereof to axially slidably receive said fixed dowels and to thereby be in driving engagement with said torque source;

a driven plate located between said driving plate and said torque source, said driven plate being provided with a frictional facing on each side thereof and having means for engagement with the torque destination;

spring means affixed to said support plate, said spring means being operable to normally provide axial force toward said torque source and operable to release said axial force; and

a plurality of activating dowels slidable in apertures in said support plate and being operable by said spring means to normally bear against said driving plate to slide said driving plate and said driven plate toward said torque source and thereby to place said driven plate in torque transmitting contact with said driving plate and said torque source, said activating dowels being slidable away from said driving plate to release said torque transmitting contact when said spring means is operated to release said axial force.

4,977,992

AUTOMATIC TRANSMISSION SYSTEM FOR VEHICLES

Masuhiro Ohtsuka; Yuji Satoh, and Hiromi Kono, all of Higashimatsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Japan

Filed Sep. 26, 1989, Ser. No. 412,682
Claims priority, application Japan, Sep. 30, 1988, 63-244275
Int. Cl.[5] B60K 41/28
U.S. Cl. 192—0.073 6 Claims

1. An automatic transmission system for vehicles in which a gear type transmission and a clutch associated with a vehicle are operated to perform an automatic gear-shifting operation, said system comprising:

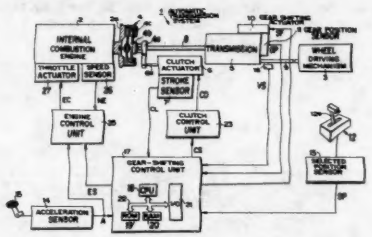
a first means for producing an acceleration signal indicative of an amount of operation of an acceleration member;

a second means for producing a vehicle speed signal indicative of a speed of the vehicle;

a determining means responsive to at least the acceleration signal and the vehicle speed signal for determining a target gear position suitable for an operating condition of the vehicle in accordance with map data for gear-shift control;

an actuating means responsive to an electric signal for manipulating the gear type transmission and the clutch;

an acceleration discriminating means for discriminating whether or not the vehicle is in an accelerating state; and



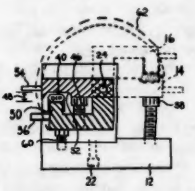
a control means responsive to said determining means and said acceleration discriminating means for providing said actuating means with necessary control signals for carrying out a gear shift-up operation in accordance with the target gear position determined by said determining means only when it is discriminated by said acceleration discriminating means that the vehicle is not in an accelerating state.

4,977,993

OUT-OF-TUBE INSPECTION PART HOLDER

Gregory M. Chapman, Meridian, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed May 12, 1989, Ser. No. 350,775
Int. Cl.[5] B65G 47/24
U.S. Cl. 193—45 10 Claims



1. An out-of-tube inspection part holder, comprising:

a. an elongate base member

b. a lower track having a rail for carrying a plurality of parts for inspection in a first inspection position;

c. an upper track pivoted about a pivot point relative to the lower track to maintain a plurality of parts between the upper and lower tracks;

d. a first stop member preventing closure of the upper and lower tracks to maintain a gap therebetween;

e. the upper and lower tracks being rotated relative to the base member about the pivot point such that the upper and lower tracks may each be pivoted about 180° to a second inspection position; and

f. a second stop member preventing rotation of the upper and lower tracks past the second inspection position.

4,977,994

FARE ADJUSTMENT MACHINE FOR PREPAID CARD TYPE TICKETS

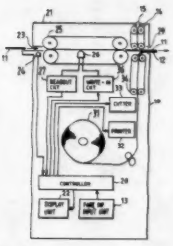
Masaharu Adachi, Gifu; Yoshiaki Uematsu, Numazu; Haruo Nagano, Ohgaki, and Koji Yamada, Gifu, all of Japan, assignors to Kabushiki Kaisha Sanyo Danki Seisakusho, Gifu, Japan

Filed Mar. 23, 1989, Ser. No. 327,871

Claims priority, application Japan, Mar. 30, 1988, 63-42199; Jun. 27, 1988, 63-85615; Jun. 27, 1988, 63-85616

Int. Cl.[5] G07F 7/00

U.S. Cl. 194—210 4 Claims



1. A fare adjustment machine comprising:

a housing;

a card insertion slot formed through a wall of said housing for receiving a prepaid card type ticket having information recorded thereon;

card detecting means disposed inside said housing near said card insertion slot for detecting the insertion of said ticket into said card insertion slot;

read/write means disposed inside said housing for reading out and rewriting said information recorded on said ticket;

controller means for performing fare adjustment processing on the basis of both said read-out information and input fare information;

printing means disposed inside said housing for printing the contents of said fare adjustment processing and said input fare information on a receipt;

an outlet slot formed through a wall of said housing;

card conveying means within said housing responsive to the detection of said ticket by said card detecting means for conveying said ticket from said card insertion slot past said read/write means toward said outlet slot;

receipt conveying means within said housing for conveying said receipt, said card conveying means and said receipt conveying means respectively defining first and second transfer paths that intersect one another;

a clamp mechanism disposed at the intersection between said first and second transfer paths for so holding said receipt that, when said prepaid card type ticket enters said intersection, an edge of said ticket pushes against a surface of said receipt;

means for releasing said receipt from said receipt conveying means to permit said ticket and said receipt to overlie each other as said ticket is conveyed toward said outlet slot by said card conveying means; and

discharge means positioned between said intersection and said outlet slot for gripping said overlying ticket and receipt and delivering them through said outlet slot.

4,977,995

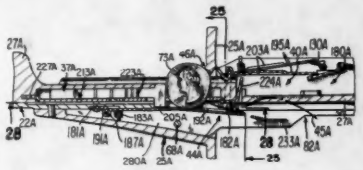
COIN CHUTE CONSTRUCTION

Mitchell A. Hall, Ft. Thomas, Ky., assignor to Monarch Tool & Manufacting Company, Covington, Ky.

Continuation-in-part of Ser. No. 928,878, Nov. 10, 1986, Pat. No. 4,799,580, which is a division of Ser. No. 623,574, Jun. 22, 1984, Pat. No. 4,640,405. This application Mar. 10, 1988, Ser. No. 166,401

Int. Cl.[5] G07F 5/06

U.S. Cl. 194—235 28 Claims



1. In a coin chute construction for a dispensing machine which requires at least one coin of predetermined size and valuation to initiate one operation of said machine for one item of goods or service, said construction comprising, a support body having an inwardly extending body portion, a slider supported on said support body for reciprocation in a rectilinear path between a fully retracted inoperative position and a fully advanced operative position thereof, at least one pocket in said slider for receiving said coin, said pocket being defined by surface means for supporting said coin so that upon moving said slider toward said operative position said coin is moved therewith to a test position and then toward said operative position, test means at said test position for testing said coin for acceptability as to valuation and genuineness and when acceptable allowing full movement of said slider to said operative position enabling said slider to initiate said one operation of said machine, means operative upon failure of said coin to satisfy the test provided by said test means at said test position to preclude said full movement to said operative position, and means for providing curvilinear movement of said coin away from and then back toward said rectilinear path during movement of said slider from said inoperative position to said test position, said providing means comprising baffle means and cooperating means for engaging and supporting said coin during said curvilinear movement to thereby assure introduction of said coin into said test means, the improvement in which said cooperating means comprises a lower bracket carried by and beneath said body portion, a lower elongate rigid member supported by said lower bracket and body portion, and a lower yieldable compression spring acting between said lower bracket and lower rigid member, said lower rigid member and lower yieldable compression spring assuring said introduction in a precise manner.

4,977,996

WAREHOUSING SYSTEMS

Edward Duce, Liversedge, England, assignor to Stockrail Limited, West Yorkshire, England

Filed Apr. 4, 1989, Ser. No. 333,491

Claims priority, application United Kingdom, Apr. 5, 1988, 8807877; Jul. 26, 1988, 8817808

Int. Cl.[5] B65G 47/46

U.S. Cl. 198—349.95 13 Claims

1. A warehousing system for the suspension and transportation of individual hangers for the support of goods or objects, comprising:

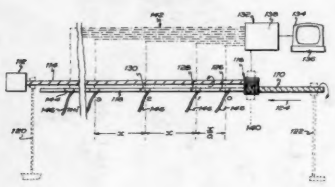
(a) a hanger delivery area;

(b) an in-feed conveyor for conveying hangers in spaced relationship from the delivery area;

(c) a plurality of in-feed conveyor distribution rails leading from the in-feed conveyor to delivery locations;

(d) a plurality of in-feed control gates in said in-feed conveyor, the operation of which causes hangers to be discharged from said in-feed conveyor to said delivery locations; and

(e) said in-feed conveyor comprising a first scroll on which the hangers can be suspended by hooking over the first



scroll, a slide bar on which the hangers slide, a second scroll operatively coupled to the slide bar to drive the hangers along the slide bar, and a transfer means enabling the hangers to transfer from the first scroll to the slide bar, said slide bar having sections which are displaceable to form said control gates.

4,977,997

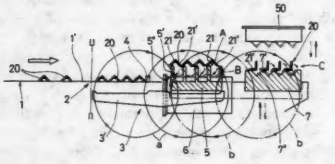
SYSTEM FOR TURNING SHAPE STEELS UPSIDE DOWN

Shogo Takigawa; Seiichi Yusa, both of Kakogawa, and Eiji Futagi, Kobe, all of Japan, assignors to Takigawa Kogyo Co., Ltd., Kakogawa, Japan

Filed Sep. 1, 1989, Ser. No. 401,846

Int. Cl.[5] B65G *47/24*

U.S. Cl. 198—374 **3 Claims**



1. A system for turning shape steels upside down, the system comprising:

conveying means for transporting shape steels along a line extending from a count-up station to a pick-up station.

shifting means for raising the shape steels from the count-up station and then lowering said steels onto a first tumbling station, and for raising at the same time the shape steels on the first tumbling station and then lowering said steels onto a second tumbling station;

the shifting means having a bar extending over the count-up station and the first tumbling station in a first position and capable of being rotated by a crank mechanism such that the bar is maintained horizontal during its rotation towards a second position covering the first and second tumbling stations;

intermediate lifting means liftable in a vertical direction, having a comb-shaped top surface and located at the first tumbling station so as to receive and preliminarily tumble each of the shape steels;

final lifting means also liftable in a vertical direction, having a zigzag top surface and located at the second tumbling station so as to receive and completely tumble each of the shape steels; and

magnetic means for magnetically attracting the shape steels on the final lifting means so as to transfer said steels onto the pick-up station, wherein the shape steels are caused by the intermediate and final lifting means to turn upside down.

4,977,998

DEVICE FOR EJECTING WRONGLY ORIENTED COVERS FROM A CONTINUOUS FLOW

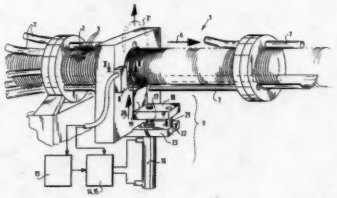
Derk J. Middeldorp, NL-8121 CS Olst, Koekoeksweg 4, Netherlands, assignor to Thomassen & Drijver-Verblifa N.V., Deventer, Netherlands

Filed Oct. 18, 1989, Ser. No. 423,957

Claims priority, application Netherlands, Jun. 27, 1989, 8901626

Int. Cl.[5] B65G *43/08*

U.S. Cl. 198—395 **7 Claims**



1. A device for removing improperly oriented covers from a continuous flow of covers, the continuous flow of covers having a flow pattern and a direction of flow, each cover having a middle portion positioned substantially in a plane perpendicular to the direction of flow and an edge portion surrounding the middle portion and oriented relative to the plane, the device comprising:

conveyor means for transporting the covers in the direction of flow;

generator means for generating a field in the continuous flow of covers;

detector means associated with the conveyor means for detecting a wrongly oriented cover by a change in the field and for generating a signal whenever a change occurs; and

ejector means associated with the conveyor means and responsive to the signals generated by the detector means for removing wrongly oriented covers from the continuous flow of covers, wherein the detector means and the ejector means are mounted to the conveyor means in substantially the same axial position relative to the flow of the covers.

4,977,999

CONTAINER HANDLER FOR CONVEYOR SYSTEM

William L. Smock, Indianapolis, Ind., assignor to Smock Material Handling Company, Inc., Indianapolis, Ind.

Filed Jun. 19, 1989, Ser. No. 369,048

Int. Cl.[5] B65G *47/34*

U.S. Cl. 198—463.3 **10 Claims**

1. A container handler for incorporation into an over-and-under conveyor system, said handler comprising:

frame means including a pair of sidewardly-spaced upright frames;

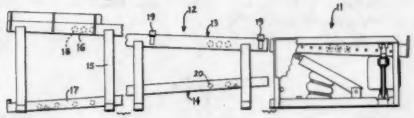
a container support platform having means defining thereon a generally upwardly facing support surface for supporting a container, said support platform being positioned generally sidewardly between said side frames and having front and rear ends, said support platform having container stop means provided adjacent the front end thereof and projecting upwardly above the support surface;

vertically slidable guide means for permitting the front end of said support platform to be vertically moved between upper and lower front end positions;

first lifting means coupled with said support platform in the vicinity of the front end thereof for vertically raising and lowering the front end of said support platform between said upper and lower positions and for permitting the front end of said support platform to be disposed at any location between said upper and lower positions;

second lifting means connected with said support platform in the vicinity of the rear end thereof for permitting the rear end to be vertically raised and lowered between upper and lower rear end positions;

said support platform sloping downwardly at a small angle as it projects from the rear end to the front end when the



ends are both in said upper positions, said support platform sloping downwardly at a small angle from the front end to the rear end when the ends are both in said lower positions, said support platform including a pair of generally parallel side rails having a plurality of freely-rotatable conveyor rolls extending there between between in generally parallel relationship to one another, said conveyor rolls having uppermost surfaces which define said support surface, said container stop being fixed to said side rails so as to project upwardly above the upper surface of the conveyor rolls adjacent the front end of the support platform; and

the slidable guide means including an upright guide rod fixedly associated with each said upright frame adjacent the front end of the support platform, a slide vertically supported on each said guide rod for slidable movement between upper and lower stops which define the respective upper and lower front end positions, and hinge means coupled between each side rail and a respective said slide for defining a generally horizontal hinge axis which extends generally parallel with the axes of said conveyor rolls.

4,978,000

CONVEYOR SYSTEM INCLUDING DISCHARGE PULLEY

Helmut Mohr, Duisburg, Fed. Rep. of Germany, assignor to PWH Anlagen & Systeme GmbH, Ingbert-Rohrbach, Fed. Rep. of Germany

PCT No. PCT/EP87/00186, § 371 Date Nov. 14, 1988, § 102(e) Date Nov. 14, 1988, PCT Pub. No. WO87/06917, PCT Pub. Date Nov. 19, 1987

PCT Filed Apr. 4, 1987, Ser. No. 274,801

Claims priority, application Fed. Rep. of Germany, May 10, 1986, 3615769

Int. Cl.[5] B65G *31/00*

U.S. Cl. 198—641 **6 Claims**

1. A conveyor belt system for varying the parabola of fall of a conveyed material, comprising:

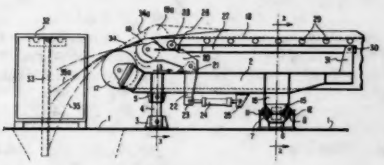
(a) a belt carrier having upstream and downstream ends;

(b) an endless conveyor belt having upper and lower runs and being supported by and traveling along said belt carrier, said upper run traveling from said upstream to said downstream end of said belt carrier, the conveyed material being projected from the conveyor belt at the downstream end of said upper run;

(c) a support roller carrier having upstream and downstream ends and having a plurality of rotatably attached support rollers for supporting said upper run of said endless conveyor belts, said support roller carrier being pivotably attached at its upstream end to said belt carrier;

(d) a return pulley means rotatably attached to said belt carrier at its downstream end for guiding said endless conveyor belt from its upper to its lower run; and

(e) means for varying the parabola of fall of a conveyed material projected from said downstream end of said conveyor belt, including



(1) a snub pulley means disposed upstream of said return pulley means for varying the height of said conveyor belt;

(2) a pivot arm means attached to said snub pulley means and pivotably attached to said belt carrier for varying the height of said snub pulley means, said pivot arm means having an upper surface;

(3) hydraulic cylinder means attached to said pivot arm means for pivoting said pivot arm means; and

(4) a supporting roller means rotatably attached to said downstream end of said support roller carrier and engaging the upper surface of said pivot arm means for pivoting said downstream end of said support roller carrier about its upstream end when said pivot arm means is pivoted to thereby adjust the slope of said carrier belt at the downstream end of said upper run.

4,978,001

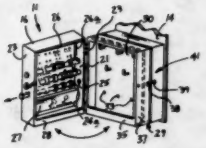
JEWELRY CLOSET

Elsie C. Nelson, 16006 State Hwy. 42, Two Rivers, Wis. 54241

Filed Nov. 20, 1989, Ser. No. 439,143

Int. Cl.[5] B65D *25/10, 5/52;* A47B *46/00*

U.S. Cl. 206—45.11 **9 Claims**



1. A jewelry closet comprising, a first section, a second section, and a third section with said first section pivotally mounted to said second section, and said second section pivotally mounted to said third section, and said third section fixedly mounted to a support plate, and said support plate including fastening means mounted onto a rear surface of said support plate for securement to a vertical support surface;

said first section defined by a first rectangular framework,

said second section defined by a second rectangular framework,

and said third section defined by a third rectangular framework, and

said first, said second, and said third rectangular frameworks each formed of equal geometric rectangular configuration and

wherein said first rectangular framework includes a forward wall parallel to and spaced from a rear wall with a plurality of posts wherein each post includes an enlarged head extending outwardly of the forward wall and extending interiorly of the first rectangular framework and wherein each post is received within an aperture formed within the rear wall, and each post includes an outwardly extenidng projection adjacent the enlarged head and wherein the projection is received within a keyhole aperture formed within the forward wall.

4,978,002

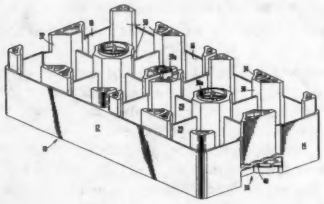
CROSS-STACKING BOTTLE CASE

William P. Apps, Anaheim; James B. Rehrig, Rancho Palos Verde, both of Calif., and John A. Hagan, Aldan, Pa., assignors to Rehrig-Pacific Company, Inc., Los Angeles, Calif.

Division of Ser. No. 186,140, Apr. 26, 1988, Pat. No. 4,899,874. This application Nov. 22, 1989, Ser. No. 440,255

Int. Cl.[5] B65D *27/00*

U.S. Cl. 206—201 **72 Claims**



1. A cross-stacking case for retaining and transporting bottles comprising:

outer side walls forming an outer shell;

a case bottom disposed substantially within said outer shell;

a plurality of means for supporting outer surfaces of bottles, generally disposed within said outer shell and each supporting means having at least one bottle supporting surface, said bottle supporting surfaces defining, in combination wtih said outer shell and said case bottom, a plurality of bottle retaining pockets with at least one bottle supporting means associated with each pocket; and

receiving means, generally disposed within said outer shell, extending above the height of a top surface of a first of said side walls and having a recess, for receiving a side wall of an upper identical case when said lower cross-stacking case is empty.

4,978,003

BRUSH HOLDER

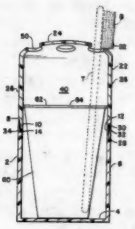
Marjorie A. Foster, Born Free Farm, Tubwreck Dr., Dover, Mass. 02030

Filed Oct. 10, 1989, Ser. No. 419,121

Int. Cl.[5] B65D *77/00*

U.S. Cl. 206—217 **2 Claims**

1. A holder for brushes, said holder comprising a bottom member having a bottom portion and a continuous upstanding first wall portion, and a top member having a top portion and a continuous depending second wall portion, said first and second wall portions being adapted to be interconnected for forming a chamber and being adapted to be readily disconnected from each other, said top portion having openings therein adapted to receive elongated handle portions of brushes such that said handle portions extend into said chamber, said top portion proximate said openings being adapted to support bristle portions of said brushes externally of said chamber, and a disposable receptacle which rests on said bottom portion of said holder in said chamber, with non-brush ends of said brush handles adapted to extend into said receptacle, the length of said receptacle exceeding the length of said



bottom member such that with the top and bottom members separated a rim portion of an open end of said receptacle extends beyond a rim portion of an open end of said bottom member and is thereby exposed.

4,978,004

FILM SPOOL STORAGE CASE

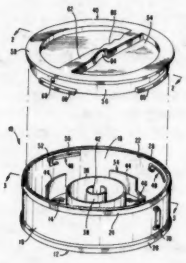
Steven Silverstein, Paris, France, and Christopher Scholz, New York, N.Y., assignors to Light & Shadow Inc.

Division of Ser. No. 156,211, Feb. 16, 1988. This application Jan. 30, 1989, Ser. No. 304,012

Claims priority, application France, Feb. 16, 1987, 87 01922

Int. Cl.[5] B65D *85/671*

U.S. Cl. 206—224 **6 Claims**



1. A film spool storage case comprising: a main housing having a base and a side wall, said base and said side wall defining a cavity for receiving a plurality of film spools therein, said side wall having a height at least as great as the height of said spools and said side wall defining an opening at an upper end thereof;

a cover releasably securable to said housing in covering relation to said opening; and

a plurality of projecting positioning means secured to said base for positioning said film spools in said cavity in spaced relation, said projecting positioning means being arranged in concentric circles within said main housing.

6. A film spool storage case comprising:

a main housing having a base and a side wall, said base and said side wall defining a cavity for receiving a plurality of film spools therein, said side wall having a height at least as great as the height of said spools and said side wall defining an opening at an upper end thereof, said cover

including a aperture for receiving a writing instrument; and

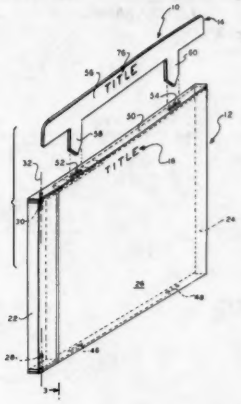
a plurality of projecting positioning means secured to said base for positioning said film spools in said cavity in spaced relation.

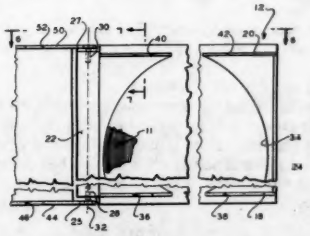
4,978,005

DISC CONTAINER ASSEMBLY

Roy J. Sammet, 6 Highview Dr., Scarsdale, N.Y. 10583

Filed Nov. 30, 1989, Ser. No. 443,925
Int. Cl.[5] B65D *85/57*
U.S. Cl. 206—312 4 Claims





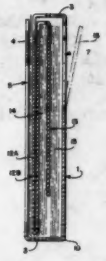
1. A disc container assembly comprising: a container holding a disc; an identifier for identifying the disc; and connection means for attaching the identifier to the container, said connection means including opening means disposed in the container and insert means projecting from the identifier, and wherein said container has a rear wall, a bottom wall with cutouts, a top wall with cutouts and left and right side walls all rigidly connected together, and a front wall forming a front door, wherein said front door has a top flange overlapping the top wall and a bottom flange overlapping the bottom wall, and wherein said opening means includes holes disposed in the top flange and overlapping respectively the top cutouts and aligned to receive the insert means.

4,978,006

PORTABLE REGISTER BOX

Olivier D. Juteau, Bouqival, France, assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Aug. 22, 1989, Ser. No. 396,695
Claims priority, application France, Sep. 30, 1988, 88 12798
Int. Cl.[5] B65D *85/67*
U.S. Cl. 206—449 9 Claims



1. A portable register box comprising:

a bottom, two lateral sides, two transversely extending sides and a cover having an opening therethrough for viewing and enabling writing on a paper strip located inside the box;

means defining a discharge slot disposed at an end of the cover adjacent a transverse side of said box;

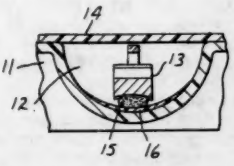
a substantially rigid plate within said box serving as a writing table located between the cover and the inner volume of the box whereby paper strip overlying the plate may be written on through said opening and paper strip stored in said inner volume, said plate extending toward the transverse side opposite said slot and leaving a passage between said opposite transverse side and an edge thereof to enable part of a paper strip contained in the inner volume to pass therefrom, about said edge, and over the plate into a writing position overlying said plate below said opening, said bottom of said box having a cutout defining an aperture for receiving discrete paper sheets into the inner volume of said box for filing therein with the paper strips in said inner volume.

4,978,007

PACKAGING CURABLE MATERIALS

Dwight W. Jacobs, River Falls, Wis., and Gregory D. Crowe, Duarte, Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 10, 1989, Ser. No. 350,609
Int. Cl.[5] B65D *83/10*
U.S. Cl. 206—469 31 Claims



1. A packaged element comprising:

(a) a substrate that transmits less than about 0.5% of selective actinic radiation and having at least one recess,

(b) a cover that transmits less than about 0.5% of the actinic

radiation and transmits at least part of the visible light spectrum,

(c) means for maintaining the cover in contact with the substrate such that the cover filters incident radiation entering the recess, and

(d) an element located in the recess and having a substance thereon that is curable by exposure to the actinic radiation.

4,978,008

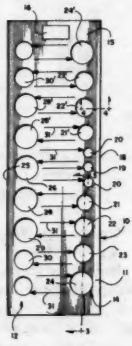
YARN COLOR ORGANIZER FOR NEEDLECRAFT PROJECT

Emil J. Dalbo, and Loraine E. Dalbo, both of Tucker, Ga., assignors to Dal-Craft, Inc., Tucker, Ga.

Filed Jun. 6, 1989, Ser. No. 362,208

Int. Cl.[5] B65D *85/67*; B65H *75/06*

U.S. Cl. 206—574 **8 Claims**



1. A yarn organizer, for organizing different colors of yarn for use in a needlecraft project, said organizer comprising a card having at least one edge, said card defining a plurality of holes therein adjacent to said at least one edge, each hole of said plurality of holes being adapted to receive a bundle of yarns therethrough and knotted between said hole and said at least one edge, said plurality of holes comprising holes of different sizes for receiving different sizes of bundles of yarn, each hole of said plurality of holes being spaced from said at least one edge by a predetermined distance that is equal for all holes of said plurality of holes, each hole of said plurality of holes being spaced from adjacent holes by a predetermined distance that is equal for all holes of said plurality of holes, said predetermined distance between holes being sufficient to maintain the strength of said card, and said plurality of holes being arranged with the smallest hole generally in the center of said card and increasing sizes of holes toward each end of said card.

4,978,009

VIDEO CASSETTE BOX WITH REMOVABLE PANEL

William Pany, 1907 Georgia Dr., Whitehall, Pa. 18052

Filed Nov. 27, 1989, Ser. No. 441,281

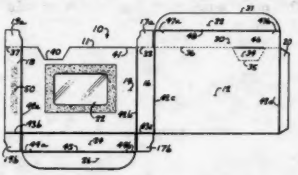
Int. Cl.[5] B65D *85/00*

U.S. Cl. 206—620 **24 Claims**

1. A box for storing an article comprising:

a top, bottom, front, back and opposing end portions defining an enclosure for the article, said front including a top edge, said top edge defining a front cutaway portion, said back including a removable closure panel foldably attached to said back along a perforated line, said line being weakened and defining a cutaway portion in said back dipping into said back opposite said front cutaway portion,

whereby the removable closure panel can be folded along the line to close the box and the removable closure panel can be torn along said line to form a sleeve-shaped container wherein said opposing cutaway sections provide access for grasping the article on opposite sides.



4,978,010

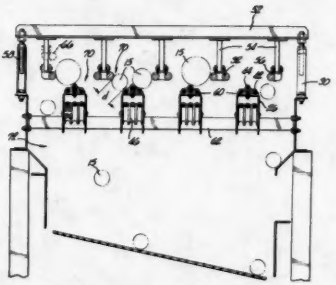
FRUIT SIZING APPARATUS

Ronald C. Bushman, Brea, and William E. Harris, Jr., Azusa, both of Calif., assignors to Brown International Corporation, Covina, Calif.

Filed Jul. 18, 1989, Ser. No. 381,504

Int. Cl.[5] B07B *13/07*

U.S. Cl. 209—663 **1 Claim**



1. A method of sorting generally round fruit by size comprising the steps of:

loading said generally round fruit into a sizing lane having first and second belts and a roller assembly spaced apart to one side of and vertically above the belts;

driving the first belt at a first speed;

driving the second belt at a second speed with the first speed being greater than the second speed; and

turning the roller so as to urge said generally round fruit from the second belt towards the first belt thereby breaking up any clusters of said generally round fruit.

4,978,011

SORTING MACHINE FOR GRAINED PRODUCTS

Frank-Otto Görlitz, and Friedrich-Wilhelm Rüsch, both of Braunschweig, Fed. Rep. of Germany, assignors to Bühler GmbH, Braunschweig, Fed. Rep. of Germany

Filed May 19, 1988, Ser. No. 196,382

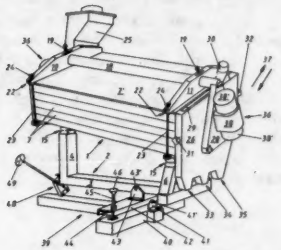
Claims priority, application Fed. Rep. of Germany, May 19, 1987, 3716664

Int. Cl.[5] B07C *9/00*; B07B *13/10*

U.S. Cl. 209—694 **13 Claims**

1. A sorting machine for grained products, comprising at least one sorting board which is inclined relative to horizontal and vertical planes and reciprocatingly vibratable in a plane and direction suitable for sorting; means for supplying a product to be sorted and arranged in one region of said sorting board; means for separating and withdrawing a sorted product

and located in another region of said sorting board, said sorting board with said supplying means and said separating and withdrawing means together forming a sorting unit; two imbalance drives which operate in opposite directions and cooperate with said sorting unit for driving the latter in vibration; a base frame; means forming at least three supporting points on which said sorting unit is supported in a vibration-damping manner freely movably so as to provide inclination of said sorting unit relative to horizontal and vertical planes; and means for additionally adjusting said inclination relative to the horizontal and vertical planes; at least one second such sorting board, each of



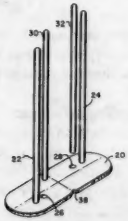
said sorting boards having one edge located in one of said regions and another edge located in the other of said regions, said sorting boards being arranged one over the other in form of a stack; means for connecting said sorting boards with one another and including an upper traverse and a lower traverse located near each of said edges so that said sorting boards are located between said upper traverses and said lower traverses, and releasable clamping elements connecting each of said upper traverses with a respective one of said lower traverses, said supporting points being arranged in said lower traverses; and at least one lower elongated supporting member fixedly connecting said lower traverses with one another.

4,978,012

APPARATUS FOR MOUNTING CLIPS AND FIXTURE THEREFOR

Jonathan H. Meyers, 221 Arleigh Rd., Douglaston, N.Y. 11363

Filed Apr. 13, 1989, Ser. No. 337,372
Int. Cl.[5] A47F *7/00*
U.S. Cl. 211—49.1 **10 Claims**



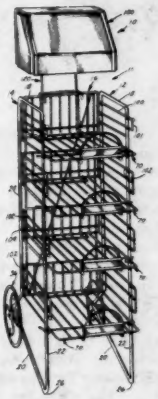
1. Apparatus for mounting clips having elongated openings, comprising a base, clip receiving elements permanently affixed to and extending from said base in substantially parallel, spaced relation and apertures in said base, associated with and proximate to each of said clip receiving elements, which receive elongated rotation preventing means therein, such that said rotation preventing means extends from said base in substantially parallel relation to the receiving element proximate thereto, said rotation preventing means and said receiving element proximate thereto being adapted to be received within the elongated clip opening and cooperating to prevent rotation of the clips during mounting thereof on said base.

4,978,013

COLLAPSIBLE DISPLAY RACK

Howard Hogg, Oakville, Canada, assignor to Cole's Quality Foods, Inc., Muskegon, Mich.

Filed Jun. 23, 1989, Ser. No. 370,635
Int. Cl.[5] A47F *5/00*
U.S. Cl. 211—181 **12 Claims**



1. A collapsible rack assembly for food and other products including bakery goods comprising:

a foldable support assembly having a back support, a pair of lateral supports pivotally secured to said back support, and engaging means for holding a plurality of shelf assemblies on said back and lateral supports, said lateral supports each having top and bottom ends;

a plurality of removable shelf assemblies mounted at vertically spaced positions on said support assembly for access at least from the front of said rack assembly, each shelf assembly having a support area for retaining items thereon and fastening means for removably securing said shelf assemblies on said engaging means;

spaced surface engaging means at said bottom end of said foldable support assembly for supporting said rack assembly in a generally upright position on a support surface/-floor;

each of said shelf assemblies including a lower support shelf having front and rear portions; said fastening means including hook means adjacent the front and rear of each of said lower support shelves for attachment to said engaging means;

each of said shelf assemblies also having a generally upright back retention area at eh rear of said lower support shelf; said shelf assemblies each including a plurality of spaced rods extending continuously from said back retention area to said front of said lower support shelf with at least one support rod extending across and under at least some of said spaced rods;

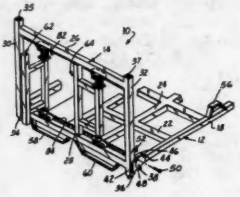
said lower support shelves each including two support rods, one adjacent the front and rear thereof; said hook means including bent rod portions extending from opposite ends of each of said support rods.

4,978,014

RAIL CAR SHIPPING RACK HAVING YIELDING RACK EXTENSION MEMBERS

John N. Humitz, Dearborn; Robert W. Potter, Trenton, and Kenneth J. Kostrzewa, Clarkston, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 21, 1989, Ser. No. 396,188
Int. Cl.[5] A47F 5/00
U.S. Cl. 211—195 **3 Claims**



1. In a shipping rack convertible to a first rack length for snug lengthwise loading across the interior width of a semi-trailer and convertible to a second rack length for snug loading lengthwise across the interior width of a railroad boxcar, the rack comprising a bottom wall having a width and a length, an upstanding end wall at each end of the length of the bottom wall, the distance between the outside surfaces of the end walls defining said first rack length, a pair of spaced apart rack extensions mounted on one of the end walls, said rack extensions being actuatable to a first position where they are folded into said one end wall to define with said other end wall the first rack length and being actuatable to a second position where they extend outwardly from the outside surface of said one end wall in which position the distance between the outer edge surfaces of the rack extensions and the outer surface of the other end wall define the second rack length, the improvement comprising:

a pivotal support means for pivotally mounting each of said rack extensions to said one end wall;

said pivotal support means further comprising a first means for holding the rack extensions in said first position and for allowing release of said rack extensions to said second position by pivoting of said rack extensions beyond a predetermined position;

a second means for yieldably centering said rack extensions into said second position and for allowing pivotal movement of said rack extensions and return centering of said rack extensions in response to external forces exerted on said rack extensions above a predetermined level whereby said rack extensions may pivotably yield to external lateral potentially damaging forces and thereafter return to the second position;

a second upwardly extending ramp surface leading from said second indentation in an upward direction wherein said rack extension may pivot in either direction when in said second position and said first and second ramps will provide biasing toward centering of said rack into said second position;

said pivotal support means comprising a pair of upper and lower hinges for pivotally attaching each of said rack extensions to said one end of said rack, said lower hinge including an upper bearing surface;

said rack extensions each including a vertical hinge rod having an upper and lower end pivotally mounted in one pair of said upper and lower hinges respectively;

a roll pin journaled through the diameter of each hinge rod at said lower end of said hinge rod, said roll pins each downwardly resting on and movable along the upper bearing surface of the respective lower hinge;

said first means further comprising a first indentation in said bearing surface for holding of said roll pin such that said rack extension is in said first position, said pin being disengagable from said first indentation by pivotal actuation of said rack extension; and

said second means further comprising a downwardly sloped ramp surface in said bearing surface leading to a second indentation for biasing said extension rack into said second position by said roll pin following said ramp downward into said second indentation;

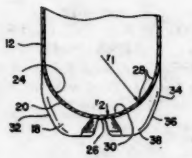
each lower hinge including a cylindrical portion having surfaces defining a bore pivotally engaging the lower end of a hinge rod, each cylindrical hinge bore portion including a lower portion connected to a hinge flange for attaching said hinge to said one of said end walls and an upper surface for defining said bearing surface, said upper surface including a radially inner edge and a radially outer edge, said downwardly sloped ramp further comprising a downward slope in the radially inward direction defined by said radially outer edge being axially higher than said radially inner edge along a common radius of said cylindrical portion whereby the roll pins engage and ride along the radially outer edge to result in reduced frictional engagement.

4,978,015

PLASTIC CONTAINER FOR PRESSURIZED FLUIDS

Larry D. Walker, Arlington, Tex., assignor to North American Container, Inc., Allentown, Pa.

Filed Jan. 10, 1990, Ser. No. 463,148
Int. Cl.[5] B65D 1/02, 1/42, 23/00
U.S. Cl. 215—1 C **9 Claims**



1. A blow-molded plastic container having a body comprising a neck portion, a generally cylindrical sideway portion and a bottom structure, said bottom structure comprising:

a central portion;

a plurality of ribs extending downwardly from said sidewall portion to said central portion, wherein each of said ribs is defined by an upper curvilinear surface and, in cross-section each rib is of a substantially inverted U-shape having a relatively tight radius, said upper rib surfaces lying on a generally hemispherical curvature in the interior of said container; and

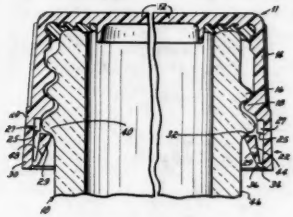
a plurality of feet extending below said central portion from said sidewall portion, each foot positioned between two of said plurality of ribs and having a pair of rib-defining endwalls connected to and continuous with the ribs on each side, a curvilinear outer wall connected to and continuous with said sidewall portion, a generally horizontal base surface joined to said outer wall, a generally vertical first inner surface forming a lip extending upwardly from the base surface, and a second inner surface extending from said lip to said central portion.

4,978,016

TAMPER INDICATING CLOSURE HAVING RETAINING HOOP WITH RELIEF WINDOWS

Thomas H. Hayes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Sep. 1, 1989, Ser. No. 401,966
Int. Cl.[5] B65D *41/34*
U.S. Cl. 215—252 **23 Claims**



14. A sealed package comprising a container and a closure secured thereon, said container being of the type having closure securing means and a locking bead below the securing means,

said closure comprising,

a top,

a shell with a depending skirt,

means on said skirt engaging the closure securing means of the container,

a tamper indicating band frangibly attached to and depending from said skirt,

a retaining hoop around a lower edge of said band,

arcuate hinges spaced along said hoop and connecting said hoop to a lower edge of said band, and

windows in said hoop, said windows being adjacent said lower edge and spacing said hinges apart,

said hoop projecting angularly inward in a direction toward said top and engaging said container below said locking bead,

the portions of said hoop which lie across of the respective windows being deformed radially outward toward said band.

4,978,017

TAMPER-INDICATING PLASTIC CLOSURE

Stephen W. McBride, Brownsburg, Ind., assignor to H-C Industries, Inc., Crawfordsville, Ind.

Continuation-in-part of Ser. No. 343,995, Apr. 26, 1989, Pat. No. 4,938,370. This application Jan. 23, 1990, Ser. No. 465,301
Int. Cl.[5] B65D *41/34*
U.S. Cl. 215—252 **14 Claims**

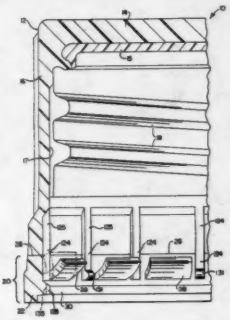
1. A tamper-indicating plastic closure for a container having an annular locking ring, said closure comprising:

a plastic cap including a top wall portion, and an annular depending cylindrical skirt portion, and

an annular pilfer band depending from said skirt portion and at least partially detachably connected thereto by frangible means comprising a plurality of circumferentially spaced frangible ribs extending between inside surfaces of said skirt portion and said pilfer band, said pilfer band being distinguished and at least partially separated from said skirt portion by circumferential score means extending partially into said frangible ribs,

said pilfer band including a plurality of circumferentially spaced, inwardly extending flexible tab means, said tab means being engageable with said locking ring during removal of said closure from said container for fracturing said frangible ribs or at least partially detaching said pilfer band from said skirt portion,

at least some of said frangible ribs extending on the inside surface of said pilfer band between adjacent ones of said



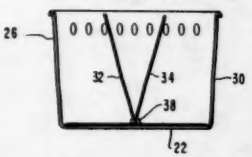
flexible tab means for centering said pilfer band on said container.

4,978,018

TRASH CONTAINER AND BAG LINER SORTER

Charles L. Wood, 1619 Ryder Cup Dr., Westlake Village, Calif. 91362

Filed Jul. 19, 1989, Ser. No. 381,857
Int. Cl.[5] B65D *90/00*
U.S. Cl. 220—1 T **14 Claims**



1. A household waste container comprising:

a bottom;

two opposite side walls and two opposite end walls extending upwardly from the bottom and terminating in an open top, the bottom, two side walls and two end walls forming an interior space;

at least one divider removably and adjustably mounted in the interior space;

guide means disposed in the interior space for positionally fixing an angle of orientation with respect to each at least one divider; and

detachable coupling means, disposed within the interior, for detachably coupling each at least one divider within the interior, wherein the detachable coupling means comprises at least one hinge having a first portion formed on the bottom of the container and a complementary second portion formed on the at least one divider.

4,978,019

MODULAR FRAME FOR FRUIT BASKETS

Ioannis Maroudas, and Theodora M. Maroudas, both of 4 Pleasant La., Oyster Bay Cove, L.I., N.Y. 11771

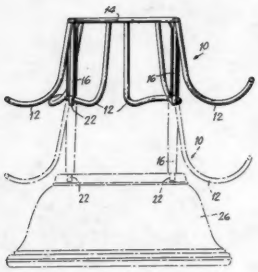
Filed Feb. 27, 1990, Ser. No. 485,950
Int. Cl.[5] B65D *6/00*
U.S. Cl. 220—4 C **10 Claims**

1. A modular frame for use in the assemblage of a fruit basket or the like, comprising:

a ring-shaped member;

loop-shaped arms rigidly secured to said ring-shaped mem-

ber and extending downwardly and outwardly from said ring-shaped member; and,



at least one support member rigidly secured to said ring-shaped member and extending downwardly from said ring-shaped member and receivable in secured relation in a sub-adjacent support member.

4,978,020

FOLDABLE BOX

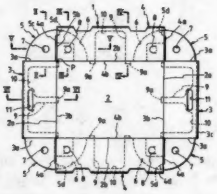
Yukihiko Aono, No. 1328-3, Sodecho, Hamamatsu-shi, Shizuoka-ken, Japan

Filed Jul. 7, 1988, Ser. No. 216,215

Claims priority, application Japan, Jul. 10, 1987, 62-173401; Jul. 21, 1987, 62-111451[U]; Mar. 11, 1988, 63-32927[U]

Int. Cl.[5] B65D *11/18*

U.S. Cl. 220—7 **10 Claims**



1. A foldable box comprising:

an essentially rectangular bottom plate formed of a flexible material;

four essentially rectangular side plates each integrally and bendably connected to the bottom plate, said side plates formed of a flexible material, wherein each two adjacent side plates includes means for detachably connecting each other;

said means for detachably connecting comprising:

four gore plates, each of said gore plates integrally and bendably connected to a side edge of the side plates;

four corresponding guide grooves, each of said guide grooves for slidingly engaging one of said gore plates, each of said guide grooves being on the edge of an adjacent side plate opposing one of said gore plates, each of said guide grooves being formed within a wall portion of the side plates near its opposing side edge between an inner surface and an outer surface of said wall portion;

an engaging piece associated with each gore plate and its corresponding guide groove, each of said engaging pieces projecting from a surface of one of said gore plate and said wall portion of the side plate having the corresponding guide groove near its opposing side edge, each of said engaging pieces being bendable towards said surface; and

an associated hole for engaging each of said engaging pieces when the gore plate is fully received into its corresponding guide groove, each of said associated holes formed in the surface of the other of said gore plate and said wall portion of the side plate having the corresponding guide groove .

4,978,021

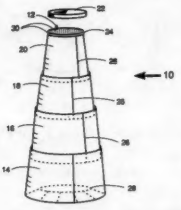
COLLAPSIBLE CONTAINER

Anna M. Mini, 3501 Branson Dr., San Mateo, Calif. 94403, and Patrick G. Vandenbroeck, 333 Dartmouth, San Carlos, Calif. 94070

Filed Apr. 4, 1990, Ser. No. 504,596

Int. Cl.[5] B65D *6/00*

U.S. Cl. 220—8 **10 Claims**



1. A collapsible container, comprising,

a plurality of tapered, hollow truncated conical sections fitted together, each having a base and an upper end, with the upper end of one section having a slightly smaller inside dimension than an outside dimension of the base end of the succeeding section above, and with each section tapering to a smaller dimension at its top, such that the sections can be collapsed together to a height generally the same as that of the lowermost section and the sections can be telescopically opened by pulling upwardly on the uppermost section to form a telescopically expanded container,

a plastic liner connected to and extending interiorly of the uppermost section,

means providing an opening at the upper end of the uppermost section, the opening being open to the interior of the plastic liner, so that a user of the container can drink liquid contents of the liner from the top of the container, and

means associated with the plurality of sections for holding the sections in the open, telescoped position.

4,978,022

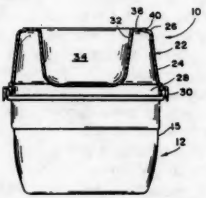
PIGGYBACK MICROWAVE CONTAINER

Robert D. Weick, Spring Lake, Mich., assignor to Gerber Products Company, Fremont, Mich.

Filed Jan. 16, 1990, Ser. No. 464,951

Int. Cl.[5] B65D *25/08*

U.S. Cl. 220—23 **22 Claims**



1. A food container comprising:

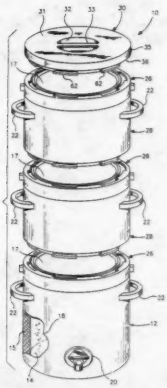
a bowl forming a first receptacle for a first food component;
said bowl having an open top;
a removable closure over said open top;
upper peripheral connector means on said bowl for engaging an overcap;
an overcap on said bowl over the top of said bowl;
said overcap having an upstanding peripheral wall and a top integral with said wall;
said overcap having an open bottom;
lower peripheral connector means on said overcap for engaging said upper peripheral connector means;
said top of said overcap having a central depression including a depending peripheral wall forming a second compartment for a second food component and surrounded by an upper rim;
a frangible annular breakaway juncture between said depression and said peripheral wall of said overcap, enabling forceful breakaway alorg said juncture to separate said second compartment from said upstanding peripheral wall of said overcap, leaving an opening in said overcap whereby the second food component can be poured from said second compartment through said overcap into said first compartment to combine such with the first food component while said upstanding peripheral wall connected to said bowl adds volume capacity thereto.

4,978,023

INSULATED MODULAR COOLER

Timothy J. Behlmann; Marianne Behlmann, both of 4126 Domenique, Florissant, Mo. 63034

Filed Mar. 22, 1990, Ser. No. 497,520
Int. Cl.[5] B65D *85/28*
U.S. Cl. 220—23.6 **7 Claims**



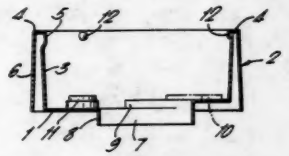
1. An insulated modular cooler comprising:
a cylindrical bottom container unit having an annular side wall that has a top edge and a bottom edge, said bottom edge being connected to a bottom wall that closes the bottom end of said container;
said top edge of said bottom container having a predetermined thickness from its inner edge to its outer edge, an annular ridge extends upwardly a predetermined height from said top edge;
said top edge of said bottom container having a relieved area adjacent its outer edge in the shape of a horizontally oriented annular channel that forms a horizontally oriented upper flange;
a locking ring having a horizontally oriented U-shaped cross section having an annular vertical portion with inwardly extending upper and lower annular flanges, said lower annular flange interlockingly mating with the horizontally oriented annular channel at the top edge of said bottom container, said upper annular flange having arcuate cutout portions spaced at predetermined intervals around its inner edge; and
a disc-shaped top cover whose bottom edge has an annular channel that matingly interlocks with the annular ridge on the top edge of said bottom container, the bottom surface of said top cover also having a relieved area adjacent its outer edge in the shape of a horizontally oriented annular channel that forms a horizontally oriented graduated lower flange, said graduated lower flange having relieved arcuate sections at predetermined intervals around its outer edge so that said flange can mate with arcuate cutout portions on the top surface of said bottom container, after which said locking ring can be rotated a predetermined distance to lock said two members together.

4,978,024

CONTAINER LID

Alec T. Newman, Banbury, and John Zeller, Northants, both of United Kingdom, assignors to General Foods Limited, Banbury, United Kingdom

Filed Oct. 24, 1989, Ser. No. 426,370
Claims priority, application United Kingdom, Nov. 4, 1988, 8825836.3
Int. Cl.[5] A47G *19/22*
U.S. Cl. 220—90.4 **9 Claims**



1. A lid for a drinking cup, whereby said lid comprises a base portion having an upstanding collar formed around the periphery thereof, said collar terminating in a rim provided with at least one orifice adapted, in use, for a beverage to be drunk therethrough, said collar having, adjacent the interior of said rim, means adapted, in use, to frictionally engage the sidewall of a first cup stocked therein, and having a skirt extending downwardly from said rim which, in use, is adapted to frictionally engage the rim of a second cup containing the beverage, and said base portion being provided with a hole adapted, in use, for the introduction of a beverage and/or beverage making ingredients therethrough.

4,978,025

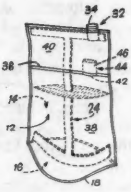
STANDABLE BAG HAVING AN INTERNAL ARMATURE

Michel Fougeres, Briare, France, assignor to Alizol S.A., Briare, France

Filed Nov. 8, 1989, Ser. No. 433,295
Claims priority, application France, Nov. 9, 1988, 88 14650; Feb. 7, 1989, 89 01549; Apr. 6, 1989, 89 04555
Int. Cl.[5] B65D *30/22, 33/02*
U.S. Cl. 222—105 **23 Claims**

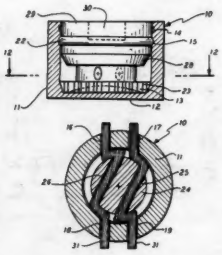
1. A bag made of sheets of heat weldable plastics assembled by welding lines along their edges, and comprising a base also made of a sheet of heat weldable plastics allowing the bag to be placed in an upright position, said bag further comprising an armature extending substantially from its base to its opposite

upper edge, wherein said armature comprises a vertical rod of length approximately equal to the height of the bag and two



crosspieces, an upper crosspiece along the upper edge of the bag, and a lower crosspiece along the base of the bag.

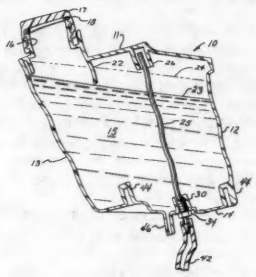
4,978,026
ROTATABLE SEAL
Richard Gnoinski, North Arlington, N.J., assignor to E. J. Brooks Co., Newark, N.J.
Filed Oct. 20, 1989, Ser. No. 424,892
Int. Cl.[5] B65D *53/00*
U.S. Cl. 220—214 **9 Claims**



1. A seal comprising:
a housing, said housing having an opening therein defined by an outer wall;
a plurality of bores formed in said outer wall of said housing for receiving a seal wire therethrough;
a rotor rotatably disposed within said opening;
at least one bore formed in said rotor, said bore in said rotor being suitable for receiving said seal wire therethrough;
first retaining means for retaining said rotor partially within said housing in a position wherein said plurality of bores in said housing are co-planar with said at least one bore formed in said rotor; and
second retaining means for retaining said rotor totally within said housing.

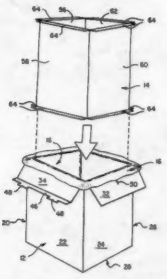
4,978,027
FUEL TANK WITH VENT SYSTEM
Robert M. Larson, Mequon, Wis., assignor to The Kelch Corporation, Cedarburg, Wis.
Filed Mar. 28, 1990, Ser. No. 500,082
Int. Cl.[5] B61C *17/02*
U.S. Cl. 220—366 **6 Claims**

1. A fuel tank having a vent system, the tank comprising:
outer top, bottom and side walls that define a fuel containing cavity;
a vent pipe having a first end opening upwardly in the cavity;
a baffle wall surrounding said first end of the vent pipe which is closed at its upper end and open downwardly;
an aperture in the outer tank wall, said vent pipe having a second end communicating with the aperture;



whereby the baffle is positioned relative to the first end of the vent pipe as to restrict the flow of fuel out the vent pipe when the fuel is agitated.

4,978,028
DISPOSABLE BIOHAZARDOUS WASTE MATERIAL CONTAINER
John W. George, and Laurence D. Taylor, both of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.
Filed Jan. 23, 1989, Ser. No. 300,677
Int. Cl.[5] B65D *25/00*
U.S. Cl. 220—403 **6 Claims**



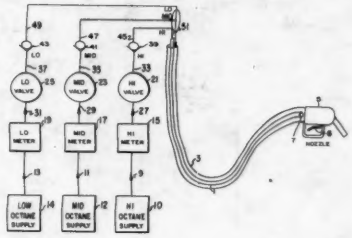
1. A disposable container for the handling of waste material, comprising:
an exterior box member having sides, a bottom and an openable and closeable top which together define a cavity;
a plastic liner having an open top and which is receivable within said cavity;
an interior insert member positioned within said plastic liner, said insert member having sides which are each parallel to and of similar dimensions to one side of said exterior box and end flaps at the top and bottom of each of said sides of said insert member integral with and in a hinged relationship with each of said sides of said insert member to maintain said insert member in a stable and equidistant relationship with respect to each of said sides of said exterior box; and
an inner box bottom positioned within the bottom of said interior insert.

4,978,029

MULTI-FUEL DISPENSER WITH ONE NOZZLE PER FUELING POSITION

Roger W. Furrow, High Point, and Harold R. Young, Kernersville, both of N.C., assignors to Gilbarco Inc., Greensboro, N.C.

Filed Jul. 3, 1989, Ser. No. 375,255
Int. Cl.[5] B67D 5/06
U.S. Cl. 222—1 23 Claims



1. In a multi-fuel dispenser with a single nozzle per fueling position, including a nozzle having an inlet port; first and second hoses each having one end for discharging fuel into said inlet port; low and mid octane flow-control valves each having an outlet port connected to the other end of said first hose, and an inlet port connected to low and mid octane fuel supplies, respectively; and a high octane flow-control valve having an outlet port connected to the other end of said second hose, and an inlet port connected to a high octane fuel supply; a method for compensating for residual low octane fuel filling said first hose at the initiation of a mid octane fuel dispensing cycle, comprising the steps of:

monitoring the dispensing of low octane fuel relative to mid octane fuel;

turning on for a relatively short pulse-like period of time said high octane flow-control valve during a mid octane fuel dispensing cycle that immediately follows a low octane fuel dispensing cycle, for partially compensating for the residual low octane fuel dispensed during the mid octane fuel dispensing cycle;

turning off said high octane flow-control valve;

turning on for a relatively short pulse-like period of time said mid octane flow control valve;

turning off said mid octane flow control valve;

repeating the previous four steps in an iterative manner until the residual low octane fuel is fully compensated; and

turning on said mid octane flow control valve for a period of time necessary to complete the dispensing of a desired quantity of mid octane fuel.

11. A multi-fuel dispenser with a single nozzle per fueling position, comprising:

low octane, mid octane, and high octane individual pressurized sources of gasoline;

a nozzle having an inlet port;

first and second hoses each having one end for discharging gasoline into said inlet port of said nozzle;

a first flow control valve connected between said low octane source of gasoline and the other end of said first hose;

a second flow control valve connected between said mid octane source of gasoline and the other end of said first hose;

a third flow control valve connected between said high octane source of gasoline and the other end of said second hose; and

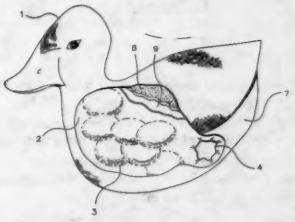
controller means programmed for (1) turning on only said third flow-control valve whenever high octane fuel is to be delivered from said nozzle, (2) turning on only said first flow control valve whenever low octane fuel is to be delivered from said nozzle, and (3) whenever mid octane fuel is to be delivered from said nozzle, in a first mode of operation only turning on said second flow control valve whenever the last delivery of fuel through said first hose was mid octane fuel, and in a second mode of operation subsequent to delivery of low octane fuel through said first hose, turning on said second flow-control valve, and turning on said third flow-control valve only for a period of time sufficient to mix in enough high octane gasoline for compensating for said first hose full of low octane gasoline.

4,978,030

CANDY DISPENSER

Arleen Morris, and Clarence D. Simpson, both of 409 Palm Ave. #C 31, Imperial Beach, Calif. 92032

Filed Apr. 17, 1989, Ser. No. 339,999
Int. Cl.[5] B65D 83/00
U.S. Cl. 221—3 1 Claim



1. A candy dispenser configured as a duck formed of elastic, or resilient material, with an internal cavity filled with egg shaped edible candies through an opening in the bottom wall of the cavity wherein the improvement comprises:

(a), the outer surface of the duck covered with a resilient plastic or other resilient textured material to simulate a feathered surface;

(b), the duck body molded of a rubber-like material in the form of a sitting duck with a hollow inner cavity;

(c), the inner cavity of the duck body being air tight;

(d), the bottom wall of the inner cavity having a dialatable opening that is normally air tight; and,

(e), a flexible tube exiting the top of the inner cavity extending into the bill of the duck terminating in a reed type air driven sound generator.

4,978,031

DISPENSER SYSTEM FOR RAZOR BLADE UNITS

Max Lembke, Middlesex, United Kingdom, assignor to Wilkinson Sword Gesellschaft mit beschrankter/Haftung, Solingen, Fed. Rep. of Germany

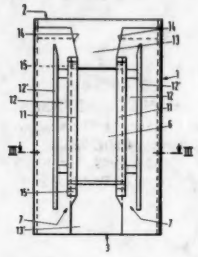
Filed Jul. 7, 1989, Ser. No. 376,663
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1988, 3822947
Int. Cl.[5] B65D 83/10
U.S. Cl. 221—102 18 Claims

1. In a dispenser system for razor blade units, several of which are successively arranged in a dispenser housing in such a way that they rest parallel against one another, with said razor blade units being adapted to be removed from, and possibly reinserted in, said dispenser housing via a handle to form a razor, and with an end of said handle, as well as said razor blade units, having latching mechanisms that cooperate with one another, the improvement wherein:

said razor blade units are disposed in said dispenser housing in such a way that they can be shifted in their entirety both perpendicular to their longitudinal dimensions as well as in a plane formed by them, with that moved-up razor blade unit that at any given time is in a forwardmost position being located, for removal thereof by said handle, in a removal position that is common for all of said razor

blade units and is provided at a removal opening that is disposed at an end of said dispenser housing; and

said dispenser housing has, for said end of said handle, a guide mechanism that ends in the vicinity of said removal opening and has a configuration that, as said handle end along with said latching mechanism thereof is guided



along, brings said last-mentioned latching mechanism into a disengaged position, whereby, as said latching mechanism of said handle end reaches said removal position, said guide mechanism releases this latching mechanism so that the latter changes into a latching position, which forms a normal position, thereby latching with said razor blade unit that is to be removed.

4,978,032

METHOD AND APPARATUS FOR DISPENSING CUPS AND VENDING MACHINES FOR BEVERAGES

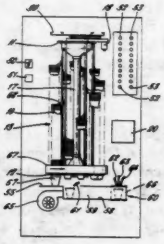
Alec T. Newman, Warmington, and David Rhodes, Banbury, both of United Kingdom, assignors to General Foods Limited, Banbury, United Kingdom

Filed Apr. 25, 1989, Ser. No. 344,323

Claims priority, application United Kingdom, Apr. 29, 1988, 8810208

Int. Cl.[5] B65H *3/32*

U.S. Cl. 221—119 **9 Claims**



1. An apparatus for dispensing the bottom cup from a selected stack of cups comprising:

(a) a rotable carriage for supporting a plurality of stacks of cups, said stacks being arranged along the rotary path of said carriage;

(b) drive means to rotate said carriage;

(c) means for selecting the stack from which a cup is to be dispensed;

(d) means for sensing when the selected stack reaches a predetermined position along the rotary path of said stacks;

(e) separating means at the bottom of each stack for separating the bottom cup from the respective stack; and

(f) a solenoid operated ramp for movement into the rotary parth of said separating means to actuate said separating means to separate the bottom cup from said selected stack, said solenoid being operated by a signal from said sensing means.

4,978,033

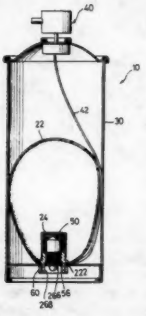
SPRAY CAN DISPENSING DEVICE INCORPORATING GAS POCKET ASSEMBLY

Sen H. Chou, No. 109, Lin Kou Rd., Lin Kou Hsiang, Taipei, Hsien, Taiwan

Filed May 30, 1989, Ser. No. 358,862

Int. Cl.[5] B67D *5/42*; B65D *35/22*

U.S. Cl. 222—94 **2 Claims**



1. A spray can dispensing device **(10)** having a gas introduction means **(50)** for introducing high-pressure gas to a gas pocket assembly **(20)**, a pressurized cylinder **(30)** for containing liquid, and a dispensing head means **(40)** having a tube **(42)** connected thereto for dispensing the liquid therethrough; said pressurized cylinder **(30)** having a central bottom hole **(32)** for mounting the gas pocket assembly **(20)**, wherein said gas pocket assembly **(20)** comprises the combination of:

an inflatable gas pocket **(22)** encompassing a cover net **(24)**, said gas pocket **(22)** having a washer-like rim **(222)** at a bottom edge thereof; and

a cylindrical mounting seat **(26)** having a centrally disposed flange **(262)** and an axial stepped hole **(264)**; said axial stepped hole **(264)** consisting of a threaded section **(266)** and a larger section **(268)** for receiving said gas introduction means **(50)**; said gas introduction means **(50)** having a lower threaded portion **(62)** and an annular lip **(54)** thereon; a washer **(66)** being disposed within said larger section **(268)** and adjacent to said annular lip **(54)**; said mounting seat **(26)** having an externally threaded portion **(28)** on a lower end thereof; said externally threaded portion **(28)** having a diameter slightly smaller than said central bottom hole **(22)**; said mounting seat **(26)** being threadedly secured at the central bottom hole **(32)** of the pressurized cylinder **(30)** with said washer-like rim **(222)** of said gas pocket **(22)** clamped between said flange **(262)** and a bottom wall **(34)** of the pressurized cylinder **(30)** by a securing ring **(60)**.

4,978,034

DEVICE FOR SUPPORTING A TOOTHPASTE CONTAINER

Philip Vishnevetsky, 31-18 Brighton 4 St., Brooklyn, N.Y. 11235

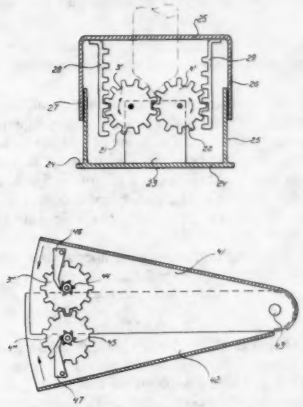
Filed Jul. 27, 1989, Ser. No. 385,423

Int. Cl.[5] B65D *35/28*

U.S. Cl. 222—102 **2 Claims**

1. A device for supporting a toothpaste container, comprising means for engaging a toothpaste container and moving the container with simultaneous squeezing of the container to push its contents outwardly of the container; means for activating said engaging and moving means and operable by the user so as

to activate said engaging and moving means and thereby to squeeze the container, said engaging and moving means including two rotatable rollers forming a gap therebetween for engaging the container and pul'ing the container through the gap during their rotation for squeezing a container, said activating means including gearings provided on said rollers and gear racks engaging with said gearings and operable by a user; a housing having a stationary housing portion which supports said rollers, and a movable housing portion which supports



said gear racks and can be moved by a user to operate said gear racks, said rollers being spaced from one another in the vertical direction, said housing portions being also spaced from one another in the vertical direction and said movable housing portions being movable by a user relative to said stationary housing portion in a vertical direction, one of said gear racks being mounted on said movable housing portion and engaging an upper one of said rollers, while the other of said gear racks is mounted on said stationary housing part and engages a lower one of said rollers.

4,978,035

NOZZLE FOR DISPENSING A PRODUCT, IN PARTICULAR A FOAMING PRODUCT

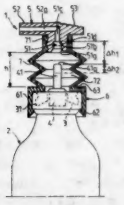
Bruno Morane, Neuilly, and Gérard Joulia, Paris, both of France, assignors to L'Oreal, Paris, France

Filed Nov. 21, 1989, Ser. No. 439,975

Claims priority, application France, Nov. 21, 1988, 8815100

Int. Cl.[5] B65D *83/14*

U.S. Cl. 222—108 **7 Claims**



1. A nozzle for dispensing a product, in particular, a foaming product, contained in a pressurized container of the type having a valve including a valve operating stem having a free end and being movably mounted in a valve cup mounted on the container, said nozzle including

fixing means for attaching said nozzle on th container;

a dispensing element having conduit means for dispensing the product from said operating stem and having a dispensing outlet at one end thereof and, at the other end thereof, wall means defining a receiving hole for receiving a portion of the operating stem, said conduit means having an interior surface which is uninterrupted between said outlet and said wall means, said wall means having a projecting portion for engaging the free end of the stem, said dispensing element having a bearing surface on which a user presses to commence the dispensing operation;

coupling means connecting said dispensing element to said fixing means;

wherein said coupling means substantially symmetrically encloses a volume between said fixing means and said dispensing element and is elastically deformable so that the distance between said dispensing element and said stem can be reduced corresponding to movement induced during the dispensing operation by a user pressing on said bearing surface between a state of repose and an actuated state in which said wall defining said hole slidably contacts the stem and said projecting portion is moved through a first distance to engage the free end of the operating stem and through a further distance to move the operating stem from a position of repose to a position where the valve is opened, said dispensing element being made of a material that remains undeformed throughout said dispensing operation, said projecting portion and said hole being spaced from the free end of the stem when said coupling means is undeformed in said state of repose.

4,978,036

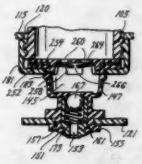
DISPENSING VALVE

Wayne D. Burd, High Ridge, Mo., assignor to Koller Enterprises, Inc., Fenton, Mo.

Filed Nov. 15, 1988, Ser. No. 271,519

Int. Cl.[5] B65D *37/00, 5/42*

U.S. Cl. 222—207 **8 Claims**



1. A dispensing mechanism for a container of liquid, the container having an opening in one side thereof, the mechanism comprising:

(a) a chamber formed in part by a flexible wall which is compressible and expandable;

(b) a planar member forming a part of the chamber;

(c) a first fluid passage for communicating between an opening in a container and the chamber through the planar member;

(d) a discharge nozzle;

(e) a second fluid passage communicating between the chamber and the nozzle; and

(f) means for compressing the wall of the chamber;

(g) first ball check valve means positioned in the first fluid passage and a second valve means positioned in the second fluid passage at a location remote from the chamber whereby liquid in the chamber is discharged through the nozzle when the wall of the chamber is compressed and liquid in the container is drawn into the chamber when the compression is released and the chamber expands, the first and second valve means including means for acting without obstructing the interior of the chamber, the first valve means being closed when the chamber is compressed and

opening when the compression is released, permitting a predetermined amount of liquid to be drawn from the container into the chamber, via the first fluid passage, when the first valve means is open.

4,978,037

DISPENSER FOR PRODUCTS IN PASTE FORM

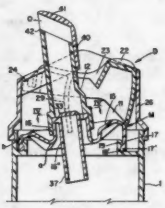
Alfred V. Schuckmann, Kevelaer, Fed. Rep. of Germany, assignor to Colgate-Palmolive Company, New York, N.Y.

Filed May 18, 1988, Ser. No. 195,249

Claims priority, application Fed. Rep. of Germany, May 20, 1987, 3716821; May 20, 1987, 3716822

Int. Cl.[5] G01F *11/00*

U.S. Cl. 222—260 **13 Claims**



1. A dispenser for materials in paste form comprising a tubular housing, discharge means at one end of said housing, piston means located in said housing and being incrementally displaceable towards said one end, a pump diaphragm connected around its peripheral edge to said housing and being displaceable from a rest position towards said piston means to cause discharge of material from said housing through said discharge means, said diaphragm including barrel means connected with said discharge means and a plurality of corrugations extending radially between said barrel means and said peripheral edge, said corrugations being generally U-shaped flexible hollow ridges which are open at the lower surface of said diaphragm towards said piston means, said ridges flexing into a spread position as said diaphragm is displaced from its rest position towards said piston means, the ridges in said spread position providing a force which enhances recovery of said diaphragm to its rest position following a pumping stroke.

4,978,038

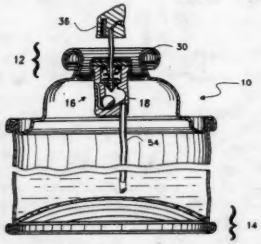
AEROSOL DISPENSER AND VALVE

Scott L. Sullivan, 3 Garden Ridge, Chappaqua, N.Y. 10514

Filed May 18, 1989, Ser. No. 353,792

Int. Cl.[5] B65D *83/14*

U.S. Cl. 222—402.19 **29 Claims**



1. A pressurized dispenser comprising:

a container for holding a product to be dispensed, said container being capable of retaining a pressurized propellent;

a valve assembly attached to said container for controlling the dispensing of said product, said valve assembly including:

a valve body having a fluid chamber;

a valve stem having an inlet and an outlet, said valve stem being movable within said valve body between a closed position where said valve stem inlet is not in fluid communication with said fluid chamber and an open position where said valve stem inlet is in fluid communication with said fluid chamber;

a first valve inlet for providing fluid communication between one portion of said container and said fluid chamber;

a second valve inlet for providing fluid communication between another portion of said container and said fluid chamber;

a closing member positioned within said fluid chamber for closing one of said valve inlets, thus preventing fluid communication through said one of said inlets, said member being movable between said inlets within said fluid chamber under the influence of forces external to the valve, the position of said member within said fluid chamber being dependent on said external forces acting on said valve; and

means for retaining said closing member at one of said inlets independent of said external forces acting on said valve.

4,978,039

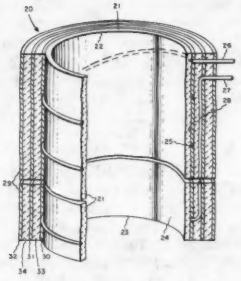
TRANSFER TUBE WITH INSITU HEATER

Milivoj K. Brun, Ballston Lake; Marcus P. Borom, Schenectady; Steven A. Miller, Amsterdam; Lawrence E. Szala, and Paul S. Svec, both of Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 27, 1989, Ser. No. 428,079

Int. Cl.[5] B22D *41/50*

U.S. Cl. 222—592 **16 Claims**



1. An integral transfer tube useful for transfer of molten metal comprised of a hollow high density tube, a continuous low density shell, and a continuous elongated heating element comprised of a spaced wound portion and two end portions spaced from said wound portion, said wound portion of said heating element being in direct contact with the outer surface wall of said high density tube, said shell surrounding at least said wound portion of said heating element and the outer surface wall of said high density tube leaving no significant portion thereof exposed, said shell being in direct contact with said wound portion of said heating element and being directly bonded to said outer surface wall of said high density tube, at least a sufficient amount of said end portions of said heating element being exposed for electrical attachment, said wound portion of said heating element being electrically characterized as having an electrical resistance and a surface area sufficient to preheat and maintain said high density tube at a temperature within 300° C. of the temperature of use of said transfer tube, said heating element being comprised of a metal or metal alloy

having a melting point higher than 700° C. and at least 200° C. higher than the temperature of use of said transfer tube, said high density tube having a density of at least about 90% of its theoretical density and being comprised of polycrystalline ceramic oxide material, said high density tube having a passageway extending through its length with a cross-sectional area at least sufficient for transfer of molten metal therethrough, said shell being comprised of ceramic oxide with at least about 75 weight % of said shell being polycrystalline, said shell being comprised of a plurality of sequential layers directly bonded to each other, said sequential layers being comprised of at least two primary layers and at least one intermediate secondary layer disposed between said primary layers, the ceramic oxide grains in said primary layers having an average size which is significantly smaller than the average size of the ceramic oxide grains in said intermediate secondary layer, said low density shell ranging in density from about 40% to about 80% of its theoretical density, said low density shell having a thermal expansion coefficient within about ±25% of the thermal expansion coefficient of said high density tube, said low density shell having a thermal conductivity at least about 10% lower than that of said high density tube.

4,978,040

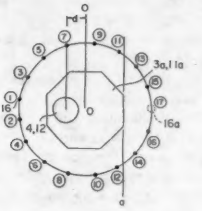
ROTARY NOZZLES

Hisao Inubush;; Tetsuya Yoshihara, and Mioshi Sakamoto, all of Kanagawa, Japan, assignors to NKK Corporation, Tokyo; Nippon Rotary Nozzle Co., Ltd.; Kokan Kikai Kogyo Kabushiki Kaisha, both of Kawasaki and Tokyo Yogyo Kabushiki Kaisha, Tokyo, all of, Japan

Filed May 24, 1989, Ser. No. 356,784

Int. Cl.[5] B22D *41/26*

U.S. Cl. 222—598 **3 Claims**



1. A rotary nozzle comprising:

a base member (2) having a bottom plate brick (3) which has a nozzle hole at a position shifted outward from the center of the brick;

a frame mounted to the base member which can be opened and closed;

a rotor having a slide plate brick with a nozzle hole for matching with the nozzle hole of the bottom plate brick and having gears on the periphery of the slide plate brick (11), and the rotor being supported at the periphery by a plurality of coil springs (16) and housed in the frame;

the coil springs being positioned around the slide plate brick, at a distance from the nozzle hole of the bottom plate brick, in a non-uniform sequence.

4,978,041

TENNIS BALL RECEPTACLE AND DISPENSER

Bill Richter, 239 Sturtz St., Barrington, Ill.

Filed Oct. 23, 1989, Ser. No. 425,560

Int. Cl.[5] A63B *61/00*

U.S. Cl. 222—608 **12 Claims**

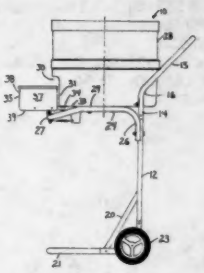
1. A ball receptacle and dispenser comprising:

(a) a wheeled frame,

(b) a barrel-like receptacle mounted on said frame,

(c) an open dispensing mouth formed in said receptacle adjacent a portion of the bottom edge thereof,

(d) a dispensing tray in open communication with said dispensing mouth and of a size to extend beyond the periphery of the receptacle and inwardly of the bottom edge thereof,



(e) means for hingedly connecting said tray to said receptacle for pivotal movement into an inclined plane relative thereto so as to permit a number of balls within said receptacle to gravitate through said dispensing mouth and into an exposed position in said tray, and

(f) means for yieldably resisting pivotal movement of said tray relative to said dispensing mouth of said receptacle.

4,978,042

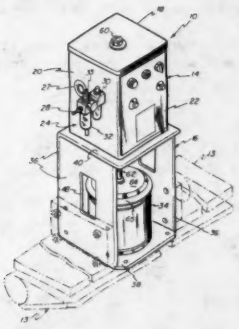
INK FEEDER FOR A LITHOGRAPHIC PRESS

Kenneth Fidler, 2519 Mayfair Dr., Lancaster, Pa. 17603

Filed Apr. 17, 1989, Ser. No. 340,116

Int. Cl.[5] G04C *23/00*; B67D *5/06*

U.S. Cl. 222—642 **14 Claims**



1. A feeder for expelling printing ink from an ink storage can directly into an ink fountain of a printing press, comprising:

a housing adapted to be mounted over the ink fountain of a press;

a double acting fluid pressure actuated ram means mounted in said housing to act along a path toward and away from the fountain;

control means including a timer for periodically advancing said ram means;

support means in said housing for receiving and locating an ink storage can in the path of said ram means;

an expeller plate carried by said ram means for movement from a position above an ink storage can to a position adjacent to the bottom of an ink storage can and dimensioned to fit within an ink storage can; and

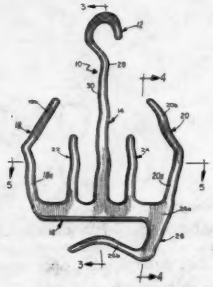
said ink can support means having a bottom opening through which ink can be expelled as the ink is forced through a hole formed in the bottom of a can placed in said support means.

4,978,043

HANGER FOR WETSUIT ACCESSORIES AND THE LIKE

Alan K. Uke, 5980 Rancho Diegueno, P.O. Box 8531, Rancho Santa Fe, Calif. 92067

Filed Jan. 17, 1990, Ser. No. 466,024
Int. Cl.[5] A47G 25/60, 25/28, 25/34
U.S. Cl. 223—88 13 Claims



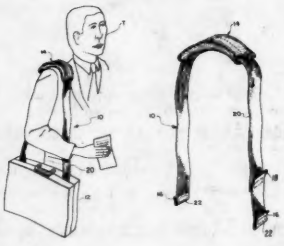
1. A hanger comprising:
a hook;
an elongated neck coupled to said hook;
a crossbar coupled to said neck opposite said hook;
a pair of outer fingers each coupled to a respective end of said crossbar, each outer finger extending in a direction of said hook;
a pair of inner fingers each respectively coupled to said crossbar on opposite sides of said neck intermediate of a respective outer finger each inner finger and parallel to said neck;
an arm coupled to said crossbar and having a portion extending in a spaced apart relationship therefrom opposite said neck and finger.

4,978,044

SLIDABLY ENGAGED LUGGAGE STRAP

Albert L. Silver, Palm Springs, Calif., assignor to Ruth Silver and Company, Calif.

Filed May 24, 1989, Ser. No. 356,132
Int. Cl.[5] A45F 3/02
U.S. Cl. 224—202 12 Claims



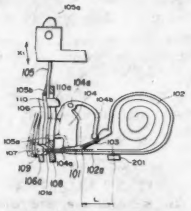
1. A strap for carrying a closeable container with closing edges that confront each other comprising an elongated band made of fabric and an escape prevention means comprising an area of fabric doubled back on itself and fastened together at each end of said strap, the thickness of said fabric adapted to permit the band to escape through said closed edges, but the thickness of said band at said area of fabric doubled back on itself being too large to escape through said closed edges.

4,978,045

SHEET STAPLER

Koichi Murakami, and Masakazu Hiroi, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 270,048, Nov. 14, 1988, abandoned.
This application Mar. 19, 1990, Ser. No. 496,137
Claims priority, application Japan, Nov. 16, 1987, 63-290294; Dec. 2, 1987, 63-305410; Dec. 9, 1987, 63-312909
Int. Cl.[5] B25C 5/04; B27F 7/21
U.S. Cl. 227—1 16 Claims



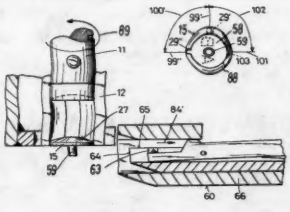
1. A sheet stapler apparatus, comprising:
a cartridge, mountable in said sheet stapler apparatus, for containing a belt of connected staple wires, said cartridge being movable from a predetermined position;
movement confining means, provided in said cartridge, for confining movement of the belt;
means for stapling sheet materials with a leading staple from the belt of staple wires;
means for feeding the belt in a forward direction from said cartridge to said stapling means;
detecting means for detecting the amount of staple wires remaining in said cartridge; and
control means, responsive to said detecting means for prohibiting said feeding means from feeding the belt, at which time said movement confining means is acting on the belt.

4,978,046

APPARATUS FOR ORIENTING ARTICLES IN RIVETING PRESSES AND THE LIKE

Paul Hagmann, and Manfred Hardt, both of Stolberg, Fed. Rep. of Germany, assignors to William Prym-Werke GmbH, & Co. KG, Stolberg, Fed. Rep. of Germany

Filed Jun. 30, 1989, Ser. No. 374,944
Claims priority, application Fed. Rep. of Germany, Jul. 4, 1988, 3822519
Int. Cl.[5] A41H 37/10
U.S. Cl. 227—4 28 Claims



1. Apparatus for orienting discrete articles of the type in-

cluding buttons, portions of rivets and other notions wherein the articles are provided with orientation indicating markers, comprising a rotary article holding device having means for non-rotatably engaging one article at a time; stepping motor means operative to rotate said holding device; a source of randomly oriented articles; a device for transferring discrete articles from said source to said holding device; sensor means provided on at least one of said devices to monitor the position of an article by scanning the article for the respective marker and including means for transmitting first signals enabling said motor means to rotate said holding device, while the article having the scanned marker is held by said engaging means, until the holding device and such article assume a first predetermined angular position; and selector means including means for transmitting to said motor means second signals to rotate said holding device and the article held by said engaging means from said first angular position to a predetermined second angular position.

4,978,047

DEVICE FOR FACILITATING THE HAMMERING OF NAIL

Alex Chen, No. 48-1, Hsueh Tien Rd., Hsueh Tein Tsun, Wu Jih Hsiang, Taichung Hsien, Taiwan

Filed Oct. 11, 1989, Ser. No. 419,673

Int. Cl.[5] *B25C 1/02*

U.S. Cl. 227—147 1 Claim

1. A device for facilitating the hammering of a nail comprising:

a substantially cylindrical outer casing having a first open end and a second open end, a lowermost portion of said outer casing having two openings symmetrically provided on a periphery thereof adjacent to said second open end;

a striking pin having a first end with a rounded head provided thereon disposed to be struck by a hammer, a first flat head having an outer diameter the same as an inner diameter of said outer casing being provided on a second end of said striking pin, an annular first hollow stop being mounted on an inner wall of said first open end of said outer casing, said first hollow stop having an outer diameter the same as said inner diameter of said outer casing and an inner diameter the same as an outer diameter of said striking pin for said striking pin to pass therethrough, said first hollow stop having a first end protruding from said first open end of said outer casing for said rounded head of said striking pin to stop thereon in response to a strike of said hammer on said rounded head, said striking pin being longitudinally slidable in said first hollow stop, said first end of said striking pin protruding from said first end of said first hollow stop, said second end of said striking pin being positioned within said outer casing, a first spring being provided between a second end of said first hollow stop and said first flat head of said striking pin for returning said striking pin back to an original position after the hammering of a nail is completed;

an inner tube being received in said outer casing and attached to said striking pin at a first end thereof, said inner tube having an outer diameter the same as said inside diameter of said outer casing and being longitudinally slidable in said outer casing;

two flexible holding strips each having a concave portion formed at a first end thereof, said two flexible holding strips being mounted on an outer periphery of a lower portion of said outer casing at a second end thereof such that each concave portion is positioned within said outer casing via corresponding said two openings of said outer casing, said concave portions of said flexible holding strips being disposed to be pushed outwardly by a head of a nail to be hammered therebetween, said concave portions of said two flexible holding strips holding the head of said nail and moving outwardly for releasing said nail in response to a strike on said rounded head of said striking pin;

an annular second hollow stop being mounted on an inner wall of said lower portion of said outer casing; and

a hammering pin passing through said annular second hollow stop and being longitudinally slidable in said second hollow stop, said hammering pin having a second flat head formed at a first end thereof and being attached to a second end of said inner tube, a second end of said hammering pin being disposed to abut the head of said nail to be hammered which is held by said concave portions of said two flexible holding strips before hammering, a second spring being provided between said second flat head of said hammering pin and said second hollow stop for repositioning said hammering pin, said inner tube and said striking pin after the hammering of said nail is completed.

4,978,048

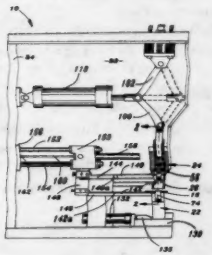
FASTENER SETTING MACHINE HAVING DOUBLE-ACTING DRIVE MEANS

Ricky W. Purcell, Gainesville, Ga., assignor to Scovill Fasteners Inc., New York, N.Y.

Filed Sep. 18, 1989, Ser. No. 408,542

Int. Cl.[5] *A41H 37/10, 37/00; B21J 15/16, 15/28*

U.S. Cl. 227—149 6 Claims



1. An attaching machine for attaching fastener parts to a garment or the like comprising:

a. a frame;

b. an upper die mounted for vertical reciprocation on the frame;

c. a lower die mounted for vertical reciprocation on the frame beneath and in cooperation with the upper die;

d. a pair of generally vertical toggle drive links pivotally linked together at a joint, the upper end of the pair pivotally secured to the frame, the lower end pivotally secured to the upper die assembly;

e. a toggle drive air cylinder having one end pivotally se-

cured to the frame laterally of the toggle joint and the other end secured to the toggle joint;

f. a wedge support shelf under the lower die;

g. wedge means adapted to reciprocate horizontally between the lower die assembly and the shelf to raise the lower die;

h. a wedge air cylinder having one end connected to the frame and the other end connected to the wedge; and

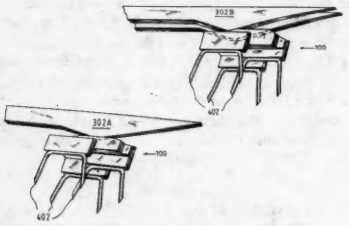
i. first air supply control means for supplying air to the air cylinders in sequence so that when the toggle drive is in the middle of either its extending or retracting stroke to lower the upper die to its lowest point of travel, the wedge is in a position at which the lower die assembly is raised to its upper point of travel and when the toggle drive is at the ends of its stroke, the wedge is in a position at which the lower die is lowered to its lower point of travel.

4,978,049

THREE STAPLE DRIVE MEMBER

David T. Green, Westport, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.

Filed May 26, 1989, Ser. No. 358,547
Int. Cl.[5] A61B *17/072*
U.S. Cl. 227—178 14 Claims



1. A surgical stapling apparatus comprising:

a cam means which is longitudinally movable through the surgical stapling apparatus and which has a camming edge for contacting a staple drive member;

actuating means including at least one drive bar for moving said cam means; and,

a cartridge including a plurality of staple drive members, each said drive member having a body portion including a distal end, a proximal end with at least one camming surface configured and dimensioned to engage said camming edge of said cam means, and three substantially rectangular pusher plates aligned in the direction of motion of said cam means wherein the respective longitudinally and vertically extending centerlines of said three pusher plates define three separate and non-intersecting planes.

4,978,050

DAMPED OPTICS TUBE ASSEMBLY

Gonzalo Amador, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 6, 1989, Ser. No. 403,634
Int. Cl.[5] H01L *21/60*
U.S. Cl. 228—4.5 15 Claims

1. A damped optics tube assembly for a wire bonder including an X-Y table on which the optics tube is mounted and a bond head attached to the optics tube, comprising:

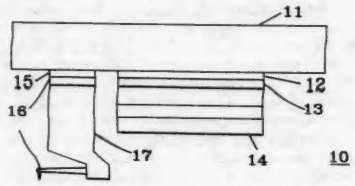
an optics tube;

an X-Y table including stepper motors for moving the table;

a bond head;

a first damping layer mounted between the optics tube and the X-Y table; and

a second damping layer mounted between the optics tube and the bond head;



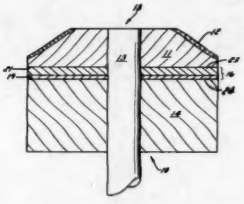
wherein the damping layers damp out vibrations to the optics tube and bond head caused by the stepper motors moving the X-Y table.

4,978,051

X-RAY TUBE TARGET

Thomas C. Tiearney, Jr.; William D. Love, both of Waukesha, and David K. Moorman, New Berlin, all of Wis., assignors to General Electric Co., Milwaukee, Wis.

Continuation of Ser. No. 432,406, Nov. 3, 1989, abandoned, which is a continuation of Ser. No. 193,604, May 13, 1988, abandoned, which is a division of Ser. No. 948,205, Dec. 31, 1986, Pat. No. 4,802,196. This application May 7, 1990, Ser. No. 520,999
Int. Cl.[5] B23K *1/19, 1/20, 101/36;* H01J *35/10*
U.S. Cl. 228—122 16 Claims



1. A method of making a composite X-ray tube target comprising the steps of:

applying a wetting agent comprising tantalum in a thickness in the range of 2,000 to 10,000 angstroms to a graphite substrate, said wetting agent having the ability to improve the liquid wetting of graphite by platinum;

positioning a layer of platinum in the form of a washer or foil layer adjacent to said wetting agent;

positioning a refractory metal target portion adjacent to said platinum; and

heating the assembly for a time and to a temperature sufficient to braze the assembly together, and wherein said tantalum is dissolved substantially completely in said platinum during heating.

4,978,052

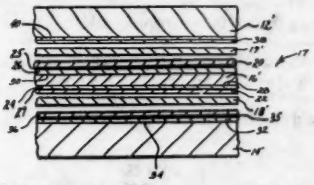
SEMICONDUCTOR DIE ATTACH SYSTEM

Julius C. Fister, Hamden; Satyam C. Cherukuri, West Haven; Deepak Mahulikar, Meriden, and Brian E. O'Donnelly, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Division of Ser. No. 928,121, Nov. 7, 1986, Pat. No. 4,872,047. This application Aug. 28, 1989, Ser. No. 399,687
Int. Cl.[5] H01L *23/14;* B23K *101/40*
U.S. Cl. 228—123 19 Claims

1. A process adapted to attach a semiconductor die to a substrate, comprising the steps of:

providing a substrate;
providing a semiconductor die;
providing a buffer component;
disposing said buffer component between said substrate and said semiconductor die for withstanding thermal stress generated from thermal cycling of said substrate and said die;
disposing a layer of solder between the substrate and the buffer component, said layer of solder for dissipating thermal stress generated from thermal cycling of said



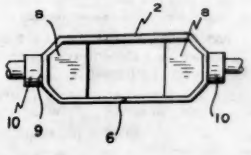
substrate and die, said solder being selected from the group consisting of gold-silicon, gold-tin, silver-tin, silver-antimony-tin, lead-indium-tin, copper-indium, lead-indium-silver, lead-indium-silver-tin and mixtures thereof;
heating the buffer component and the substrate to bond the buffer component to the substrate;
disposing a silver-glass adhesive between the die and said buffer component bonded to the substrate component; and
heating the adhesive, die and buffer component to melt the silver-glass adhesive and bond the buffer component to the die.

4,978,053

METHOD FOR MAKING A FRAME-LIKE SHELL

Sueo Ohsawa, Kariya, Japan, assignor to Kabushiki Kaisha Ohsawa Engineering and Toshiba Ceramics Co., Ltd., both of, Japan

Filed Nov. 17, 1989, Ser. No. 437,794
Int. Cl.[5] B23K *101/24;* **B22C** *21/14;* **B22D** *41/30, 41/32*
U.S. Cl. 228—149 **7 Claims**



1. A method for making a frame-like shell into which a refractory member is fitted for use in a steel casting apparatus, comprising the steps of:
bending a band-like plate until both ends of the bandlike plate meet with each other;
joining the ends of the band-like plate by welding so as to make a loop;
placing a pair of first and second inner dies inside the loop and a pair of first and second outer dies outside the loop;
holding one end of the loop by the first outer and inner dies and the opposite end of the loop by the second outer and inner dies; and
pressing the loop by the first and second inner dies while the loop is held by all of the dies.

4,978,054

DIFFUSION BONDING PROCESS FOR ALUMINUM AND ALUMINUM ALLOYS

William A. Ferrando, Arlington; Amarnath P. Divecha, Falls Church, and Subhash D. Karmarkar, Great Falls, all of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 3, 1990, Ser. No. 548,331
Int. Cl.[5] B23K *1/20, 20/00, 101/02, 103/16*
U.S. Cl. 228—194 **27 Claims**

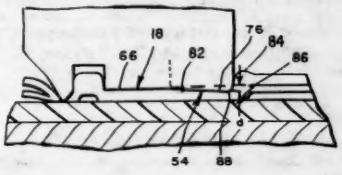
1. A method of diffusion bonding metal pieces together comprising:
(1) coating the surface of a first metal piece and the surface of a second metal piece which are to be bonded together with molten $AgNO_3$ at a temperature above the melting point of $AgNO_3$ but below the decomposition temperature of $AgNO_3$, wherein metals of the first and second metal pieces are the same or different and are selected from the group consisting of aluminum and aluminum alloys;
(2) decomposing the molten $AgNO_3$ at a temperature of from the decomposition temperature of silver nitrate up to 525° C. to form a thin, uniform coating of silver metal on the metal surfaces to be bonded;
(3) placing the silver metal coated metal surfaces to be bonded into contact with each other; and
(4) heating the metal pieces at a temperature of from 475 to 525° C. until the diffusion bond is formed.

4,978,055

REINFORCED POCKET STRUCTURE FOR THERMO-ADHESIVE MATERIALS

William R. Miller, West Covina, Calif., assignor to Rembrandt Photo Services, Los Angeles, Calif.

Filed Apr. 27, 1989, Ser. No. 344,308
Int. Cl.[5] B65D *27/00, 27/08*
U.S. Cl. 229—72 **25 Claims**



1. An upper electrode die of a high frequency welding press having a lower electrode platen, comprising:
a seam producing die surface for producing a welded seam sealing two superposed thermo-adhesive sheets when interposed between said platen and said die to form a pocket having an opening:
a first widened die surface portion inwardly extending and downwardly inclined from said seam producing die surface, for overlying a first corner of the pocket at the pocket opening when the superposed sheets are interposed between said platen and said die for producing a first weld sealing the sheets at the first corner of the pocket opening; and
a second widened die surface portion inwardly extending and downwardly inclined from said seam producing die surface, for overlying a second corner of the pocket at the pocket opening when the superposed sheets are interposed between said platen and said die for producing a second reinforcing weld sealing the sheets at the second corner of the pocket opening.

4,978,056

PACKAGING

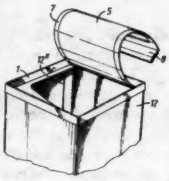
Martin F. Ball, Cottage, Walnut Tree Grove, and Ian M. Vokins, 18 Linden, Crescent, Grove, both of Wantage, Oxfordshire, United Kingdom

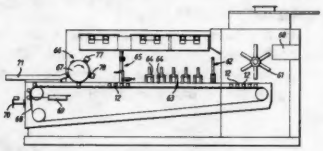
Filed Nov. 23, 1988, Ser. No. 277,155

Claims priority, application United Kingdom, Dec. 31, 1986, 8631049; South Africa, Dec. 29, 1987, 87/9738

Int. Cl.[5] B65D *51/00, 5/70*

U.S. Cl. 229—123.2 **27 Claims**





12. In combination, a container (**12**) and a dish-like article (**1**) which is of sheet material (**2**), characterized in that a base of the article (**1**) includes a portion (**5**) partially severed from the remainder of the article (**1**) along substantially a line of severance (**4**) in the form of an open loop, said article constituting a closure (**1**) for said container (**12**), the container (**12**) having a mouth an edge of which has internally a discontinuity (**12'**, **12''**), and the closure (**1**) comprising a laminate sheet material (**2**) including a layer of a thermoplastic substance (**2D**) arranged to come face-to-face with said discontinuity (**12'**, **12''**), characterized in that said layer of a thermoplastic substance (**2D**) is of sufficient thickness to fill said discontinuity (**12'**, **12''**) during heat-sealing of said closure (**1**) to said container (**12**).

4,978,057

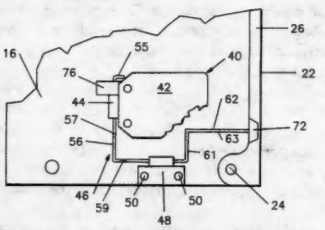
MAILBOX SIGNAL

Walter C. Roden, 14013 Wyandotte Dr., SW., Huntsville, Ala. 35803

Filed Mar. 19, 1990, Ser. No. 497,131

Int. Cl.[5] B65D *91/00*

U.S. Cl. 232—35 **20 Claims**



1. A self-contained signalling device having a raised, non-signalling position, and a lowered, signalling position, and adapted for attachment to a standard mailbox having a top wall, substantially vertical side walls, a bottom, and an open front end capable of being closed by an outwardly, downwardly, swinging door pivotably mounted thereto, said door having a lip portion which surrounds the outer surface of the forward edges of said side walls and said top wall when said door closes said open front end, said signalling device comprising:

a flag;

flag support means disposed for pivotal support of said flag and for displacement thereof between said non-signalling and signalling positions, said flag support means including an arm having pair of spaced end sections and a joining intermediate section, one of said end sections being disposed for engaged relation with said door responsive to closing thereof for retention of said flag in said non-signalling position and for disengagement from said door responsive to opening thereof whereby said flag is pivotably displaced to said signalling position; and,

stop means for limiting the movement of said flag responsive to said pivotal displacement thereof.

4,978,058

FLOW CONTROL SYSTEMS AND/OR LAUNDRY MACHINES INCLUDING SUCH FLOW CONTROL SYSTEMS

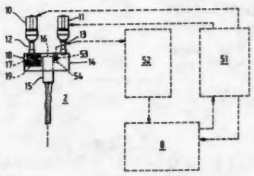
Gerald Duncan; Frank W. Shacklock, and Murray Greenman, all of Auckland, New Zealand, assignors to Fisher & Paykel Limited, Auckland, New Zealand

Filed Feb. 7, 1989, Ser. No. 307,275

Claims priority, application New Zealand, Feb. 9, 1988, 223460

Int. Cl.[5] G05D *23/13*

U.S. Cl. 236—12.12 **11 Claims**



1. A method of controlling temperature of a mixture of two liquids supplied to a mixing chamber, each liquid having a different temperature level and a first one of said liquids having the higher temperature level being caused to flow through a selected first valve and the second one of said liquids being caused to flow through a second valve to said mixing chamber, each of said valves having a valve seat, a spring loaded valve member spring loaded to a closed position against said valve seat and an electromagnet effective on energization to actuate said spring loaded valve member towards a fully open position and actuable by causing a current to flow through said electromagnet to cause said electromagnet to progressively open said valve member, said method comprising:

opening said second valve to a desired degree of opening;

controlling the current flowing in said electromagnet of said selected first valve in a manner so that the greater the current flowing the greater the flow of liquid through said selected first valve;

sensing the temperature in said mixing chamber and controlling the current flowing in said electromagnet of said selected first valve according to said temperature of the liquid in said mixing chamber in a manner such that said valve member of said selected first valve progressively opens or closes so that the temperature of said mixture of said two liquids flowing through said first and second valves is maintained equal to or approaching a desired level in said mixing chamber, and when said first valve is opened to the fully open position and the desired raised temperature in said mixing chamber has not been reached,

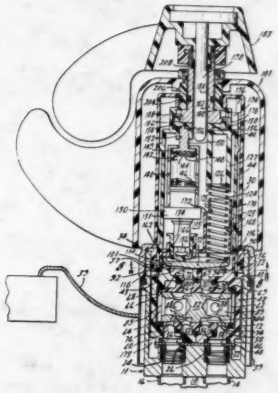
progressively closing said second valve to further increase the temperature of liquid in said mixing chamber up to the temperature level of said first liquid when said desired temperature is equal to or higher than said first liquid temperature level.

4,978,059

MODULAR PRESSURE BALANCED VALVE ASSEMBLY

James R. Nicklas, Noblesville, Ind.; Eric VO Pullen, deceased, late of Ormond Beach, Fla, legal representative; Antoinette D. Pullen, Ormond Beach, Fla., assignors to Masco Corporation, Taylor, Mich.

Division of Ser. No. 247,781, Sep. 20, 1988, Pat. No. 4,905,732, which is a continuation of Ser. No. 763,445, Aug. 7, 1985, Pat. No. 4,915,295. This application Nov. 22, 1989, Ser. No. 440,956
Int. Cl.[5] G05D *23/13*
U.S. Cl. 236—12.17 11 Claims



1. A mixing valve characterized by:

a body having first and second supply ports and an outlet;

a pivotally mounted lever having valving surfaces and pivotally mounted about a fulcrum with respect to said body to restrict and adjust relative flow through said ports;

means for controlling the pivotable position of said lever and said valving surfaces for controlling the relative flow through the first and second supply ports;

said means for controlling said pivotal position of said lever including a post operably engaging said lever at a position spaced from said fulcrum of said lever; and

handle means operably connected to said post to operably move said post thereby pivoting said lever.

4,978,060

ENGINE COOLANT THERMOSTAT WITH PRESSURE RELIEF FEATURE

Daniel C. Stahly, Elmhurst, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 15, 1990, Ser. No. 494,199
Int. Cl.[5] F01P *7/02*
U.S. Cl. 236—34.5 12 Claims

1. A combination temperature control and pressure relief valve assembly comprising:

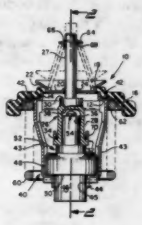
(a) an annular mounting member having an annular elastomeric valve seat formed thereon about the inner periphery thereof on one axial side thereof, and an elastomeric covered mounting flange about the outer periphery;

(b) an annular poppet movable between a closed position contacting and a plurality of open positions spaced from said valve seat;

(c) actuator rod means slidably received through said poppet and extending axially a distance from said valve seat, said rod means defining on the side of said mounting member opposite said valve seat certain surfaces for axial registration against said poppet;

(d) bracket means extending axially from said mounting member on the side thereof opposite said valve seat;

(e) thermally responsive actuator means having a reaction surface thereof registered against said bracket means and a force output member thereof disposed for bearing against said rod means for effecting movement thereof and movement of said poppet away from said valve seat;



(f) first spring means operative to bias said actuator means against said bracket means;

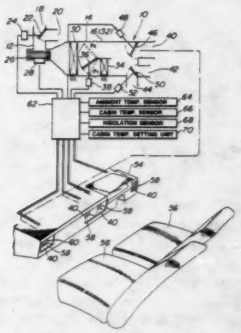
(g) second spring means biasing said poppet against said valve seat with a predetermined force equivalent to a desired fluid relief pressure acting over the effective area of said poppet such that said poppet moves to one of said plurality of open positions when said fluid relief pressure is exceeded.

4,978,061

AIR CONDITIONER SYSTEM FOR AUTOMOTIVE VEHICLE

Yoshiyuki Ogihara; Junichiro Hara, and Hideo Takahashi, all of Kanagawa, Japan, assignors to Nissan Motor Company, Ltd., Yokohama, Japan

Filed Dec. 20, 1988, Ser. No. 286,826
Claims priority, application Japan, Dec. 21, 1987, 62-323372
Int. Cl.[5] F24F *7/00*
U.S. Cl. 236—49.3 6 Claims



1. An air conditioner system for an automotive vehicle comprising:

conditioning air passage means defining a conditioning air path and including an air outlet which opens into a vehicular cabin for discharging conditioning air into said vehicular cabin;

conditioning air generating means for adjusting temperature

of the conditioning air to be discharged into said vehicular cabin;

temperature setting means for allowing manual setting of a desired temperature of the conditioning air in said vehicular cabin to produce a first signal indicative of the set temperature;

first sensor means for monitoring temperature in said vehicular cabin to produce a second signal indicative of the vehicular cabin temperature;

second sensor means for monitoring insolation in said vehicular cabin to produce a third signal indicative of the insolation; and

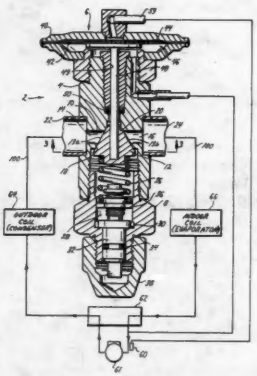
control means, associated with said conditioning air generating means, for adjusting discharge amount of said conditioning air into said vehicular cabin depending upon the difference between said first and second signal values, and causing said discharge amount to fluctuate between predetermined low and high values when the difference between said first and second signal values is less than a predetermined value, said control means for adjusting period of low and high values depending upon said third signal value.

4,978,062

THERMOSTATIC EXPANSION VALVE WITH BI-DIRECTIONAL FLOW

Harold T. Lange, Sr., Frontenac, Mo., assignor to Sporlan Valve Company, St. Louis, Mo.

Filed Feb. 28, 1990, Ser. No. 486,804
Int. Cl.[5] F25B *41/04*
U.S. Cl. 236—92 B **10 Claims**



1. A thermostatic expansion valve for heating-cooling refrigeration systems of the type having an evaporator and a condenser, the expansion valve, without a check valve, providing for bi-directional flow, comprising:

(a) upper and lower valve bodies, the upper valve body having a substantially transverse linear flow channel therethrough,

(b) a control valve element disposed in said flow channel dividing the channel into identical inflow-outflow chambers, one on each side of the control valve, thereby requiring no change in superheat when flow is reversed,

(c) a control valve seat adapted, when the control valve element is seated, to prohibit flow from one chamber to the other in either direction,

(d) inflow-outflow port disposed on each flow chamber end away from the control valve, the ports being substantially equally sized and symmetrically formed so that inlet pressures are the same regardless of direction of flow,

(e) spring biasing means within the lower valve body urging the control valve element into a closed position in the valve seat, and

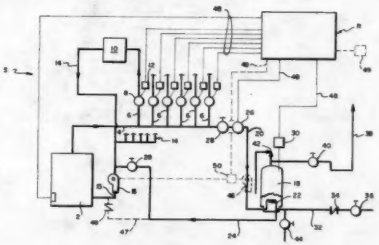
(f) said control valve element having similar control valve surfaces facing each flow chamber, adapted to urge the control valve to an open position against the biasing spring by a higher pressure in either chamber on either side of the control valve depending upon the direction of flow.

4,978,063

AUTOMATIC CONTROL DEVICE FOR INDIRECT FIRED WATER HEATERS AND HEAT EXCHANGERS

Kent B. Chase, 2319 Marlborough Rd., Colorado Springs, Colo. 80909

Filed Jan. 31, 1990, Ser. No. 472,791
Int. Cl.[5] F24D *3/00*
U.S. Cl. 237—8 R **18 Claims**



1. An automatic control device for a hydronic heating system for space heating and water heating, said device comprising:

(a) a first relay means for connecting to a water temperature switch operably associated with a water heater such that said first relay means is energized and deenergized when the switch is closed and opened, respectively;

(b) said first relay means being connectable to an electrically operated valve controlling the flow of high temperature water from a boiler to a heat exchanger operably associated with the water heater such that the electrically operated valve is opened and closed when said first relay means is energized and de-energized, respectively;

(c) said first relay means being connectable to the boiler such that the boiler is turned on when said first relay means is energized;

(d) a second relay means for connecting to said first relay means such that said second relay means is energized and de-energized when said first relay means is energized and de-energized, respectively; and

(e) said second relay means being connectable to a plurality of zone valves controlling the flow of high temperature water from the boiler to a plurality of space heaters such that the plurality of zone valves are closed when said second relay means is energized, thereby diverting at least a substantial portion of the output of the boiler to the water heater when the water temperature switch is closed.

4,978,064

SYSTEM AND METHOD OF HEAT DISTRIBUTION IN ENGINE POWERED CRAFT

Norman F. Steiner, Longmont, Colo., assignor to Air Comm Corporation, Boulder, Colo.

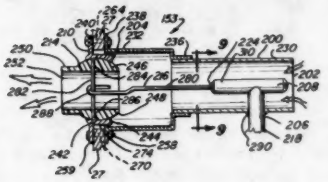
Filed Dec. 29, 1988, Ser. No. 291,495
Int. Cl.[5] B60H *1/02*
U.S. Cl. 237—12.3 A **20 Claims**

1. A unit for selective distribution of heated fluid in a selected area, said fluid being heated by mixing of hot fluid supplied under pressure from a hot fluid source with fluid at

ambient temperature from the selected area in said unit, said unit comprising:

valving means for selective conduct of said hot fluid therethrough and including an inlet terminal connected with said hot fluid source, at least a first outlet terminal, and fluid flow control means for controlling flow of said hot fluid through said outlet terminal;

fluid collecting means having at least said outlet terminal of said valving means positioned therein, said fluid collecting means including an inlet port for receipt therethrough of said fluid at ambient temperature from said selected area and an outlet port for distribution of said heated fluid to said selected area therethrough, said outlet terminal of said valving means being positioned between said ports



and oriented so that hot fluid under pressure is directed into said fluid collecting means in a direction having a component toward said outlet port to thereby induce movement of said fluid at ambient temperature into said inlet port; and

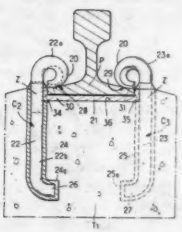
actuating means mounted adjacent to said outlet port of said fluid collecting means and connected with said fluid flow control means of said valving means for selectively actuating said fluid flow control means so that said hot fluid is conducted through said outlet terminal of said valving means into said fluid collecting means to thus mix said hot fluid and said fluid at ambient temperature in said fluid collecting means thereby providing said heated fluid for distribution through said outlet port of said fluid collecting means to said selected area.

4,978,065

METHOD AND APPARATUS FOR ATTACHING A RAIL USING PLASTICALLY DEFORMABLE METAL SPIKES AND METAL SPIKES PER SE

Michel Deuchemin, Cambrai, France, assignor to Allevard Industries S.A., Meylan, France

Filed May 19, 1989, Ser. No. 354,275
Claims priority, application France, May 26, 1988, 88 07037
Int. Cl.[5] E01B 9/28
U.S. Cl. 238—366 **28 Claims**



4. A spike of fixing a rail on a rail-support comprising a shaft having:

a top portion terminated by a head for bearing against a rail flange,

a bottom portion including at least one zone made of a plastically deformable material different from that of the rest of the spike outside said zone,

wherein said zone constitutes a twisting means for permitting the head to be twisted relative to the bottom portion of the spike, and

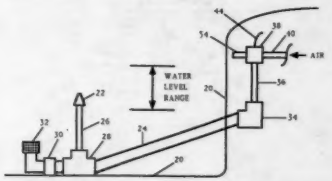
antirotation means at the bottom portion of said shaft for co-operating with complementary means in the rail support for preventing any relative rotation between said bottom portion and said rail support, when a couple below a predetermined value is applied to the top portion of said spike.

4,978,066

FAST ACTING AIRPOWERED WATER DISPLAYS

Mark W. Fuller, Studio City, and Alan S. Robinson, El Monte, both of Calif., assignors to Wet Designs, Universal City, Calif.

Filed Aug. 14, 1989, Ser. No. 393,560
Int. Cl.[5] B05B 17/08
U.S. Cl. 239—12 **42 Claims**



1. An air powered water display comprising:

at least one nozzle disposed to direct water therefrom;

water reservoir means disposed below the surface of a pool of water and coupled to said at least one nozzle for supplying water thereto;

means for controllably supplying air under pressure to said water reservoir means to force water therefrom and out said at least one nozzle, and for controllably removing air pressure from said water reservoir when water is being forced out of said reservoir to stop the same; and,

refilling means coupled to said water reservoir means for allowing water to flow into said water reservoir means from a pool of water below the surface of which said water reservoir means is disposed when the pressure of the water in the pool of water adjacent said refilling means is higher than the pressure of the water in the water reservoir means adjacent said refilling means.

35. A method of generating a water display comprising the steps of:

(a) providing;

(i) at least one nozzle disposed to direct water therefrom;

(ii) water reservoir means disposed under a pool of water and coupled adjacent the bottom of said reservoir to said at least one nozzle for supplying water thereto;

(iii) means for controllably supplying air under pressure to said water reservoir means adjacent the top thereof and for removing air pressure therefrom, said last named means including a source of air under pressure and a controllable valve means; and,

(iv) check valve means coupled to said water reservoir means for allowing water to flow into said water reservoir means from a pool of water in which said water reservoir means is disposed when the pressure of the water in the pool of water adjacent said check valve means is higher than the pressure of the water in said water reservoir means adjacent said check valve means;

(b) controlling said valve means in time and duration to provide bursts of water from said at least one nozzle correspondingly controlled in time and duration to provide a form of dynamic water display using a duty cycle which keeps sufficient water in said water reservoir means to prevent air from the supply of air under pressure from

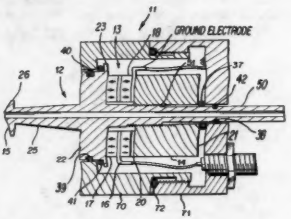
being expelled from said at least one nozzle during a burst of water from said at least one nozzle.

4,978,067

UNITARY AXIAL FLOW TUBE ULTRASONIC ATOMIZER WITH ENHANCED SEALING

Harvey L. Berger, Hyde Park; Alan Paul, Kingston, and William J. Broe, Stanfordville, all of N.Y., assignors to Sono-Tek Corporation, Poughkeepsie, N.Y.

Filed Dec. 22, 1989, Ser. No. 455,252
Int. Cl.[5] B05B 3/14
U.S. Cl. 239—102.2 3 Claims



2. An ultrasonic liquid atomizing transducer assembly with enhanced sealing against external fluids comprising:

a driving element including a pair of annular piezoelectric disks and an input electrode;

means for feeding ultrasonic frequency electrical energy thereto;

a cylindrical rear dummy section having a front end contacting one piezoelectric disk of the driving element, a rear end, a threaded bore, and a constant outside diameter from the front end to the rear end;

a unitary axial feed tube and atomizing surface, comprising from front to rear;

(a) an atomizing tip;

(b) a conical quarter wavelength amplifying probe or horn extending to:

(c) a disk section with front, rear, and circumferential surfaces, said rear surface comprising a circumferential flange sized for the retention of a sealing ring, and said circumferential surface of said disk having a groove cut thereinto to act as a receptacle for a sealing ring;

(d) an axial flow tube of reduced diameter which bears threads on its outer mid-section for the threadable attachment of the dummy section thereto, and which bears at its rear end a groove cut thereon to receive a sealing ring;

(e) an axial through-bore for the passage of fluid;

two piece cup-shaped housing elements threadably attached to each other so as to define a gap therebetween for the placement of a sealing ring,

a sealing ring within said gap,

front and rear end faces which contain holes sized to mate with the front disk and reduced diameter axial flow tube portion respectively,

sealing rings placed along the outer portion of the front disk against the flange there situated and within the circumferential groove of the front disk which mate against the front face of the front housing element,

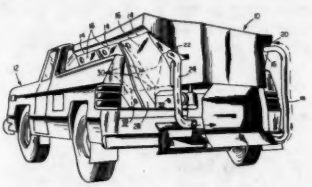
sealing rings placed immediately adjacent the rear wall of the dummy section and within the groove along the axial flow tube to mate with the face of the rear housing element and act as rear and front bumpers to maintain the transducer structure in place inside the cups.

4,978,068

EXHAUST HEATED SPREADER

Stanley W. Eldridge, P.O. Box 273 Mass Ave., Center Ossipee, N.H. 03814

Continuation of Ser. No. 369,316, Jun. 20, 1989, abandoned.
This application May 18, 1990, Ser. No. 525,307
Int. Cl.[5] B05B 1/24
U.S. Cl. 239—129 3 Claims



1. An apparatus for heating traction-improving material contained in a bin mounted on a motor vehicle, said bin, having an ejection manifold to slowly permit escape of said traction-improving material, attached and supported on the motor vehicle by solid buttress supports, said solid buttress supports projecting orthogonally from the exterior side walls of the bin, said apparatus comprising:

panels, attached to the exterior side walls of the bin so as to form a sealed cavity between the exterior side walls of the bin and the panels, said panels attached such that a portion of each of said solid buttress supports is contained within said cavity;

holes formed through said portions of said solid buttress supports contained within said sealed cavity, so as to permit free flow of the hot exhaust through said cavity;

piping, operatively connecting an exhaust manifold of the motor vehicle engine to a sealed cavity entrance portal positioned proximately to said ejection manifold; and

a sealed cavity exit portal positioned proximately to said ejection manifold to permit escape of hot exhaust after flowing through the sealed cavity.

4,978,069

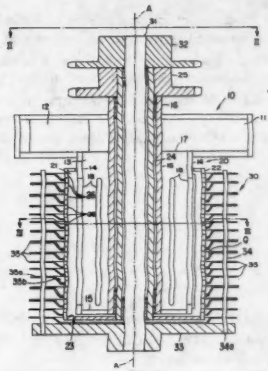
METHOD AND APPARATUS FOR THE FORMATION OF DROPLETS

Ralf Andersson, Frostgatan 88, and Alf Andersson, Centralgatan 9, both of S-260 35 Ödåkra, Sweden

PCT No. PCT/SE88/00145, § 371 Date Oct. 16, 1989, § 102(e) Date Oct. 16, 1989, PCT Pub. No. WO88/07414, PCT Pub. Date Oct. 6, 1988
PCT Filed Mar. 25, 1988, Ser. No. 411,478
Claims priority, application Sweden, Mar. 27, 1987, 8701274
Int. Cl.[5] B05B 5/04
U.S. Cl. 239—224 15 Claims

1. A method of dividing a liquid into droplets, the liquid being transferred via a stationary liquid-receiving means (10; 110) to a slinger rotor (30; 130) which is rotated relative to said receiving means (10; 110) about a stationary geometrical axis (A), said slinger rotor (30; 130) having at least one disk (35; 135) extended radially to said axis (A) and having at a radially outer peripheral edge circumferentially equidistant, uniform and radially projecting portions (36) designated cusps hereinbelow, such that the liquid received on the disk (35; 135) is formed into a uniform thickness film which, by centrifugal action, grows radially outwardly toward said cusps (36) and is divided thereby into uniform size droplets, characterised in that the liquid is transferred in a first step from said stationary receiving means (10; 110) to a distribution rotor (20; 120) rotationally independent of said receiving means (10; 110) and said slinger rotor (30; 130); that the liquid in a second step is transferred by the centrifugal force produced by said distribution rotor (20; 120) from said distribution rotor (20; 120) to the disk

(35; 135) of said slinger rotor (30; 130) via at least one distribution opening (26; 126) provided in said distribution rotor (20; 120) and located at a radial distance from the axis (A); and that said distribution rotor (20; 120) is rotated about the axis (A) at



an angular velocity different from the angular velocity of said slinger rotor (30; 130), in order to uniformly and, relative to the axis (A), circumferentially distribute the liquid transferred through said distribution opening (26; 126) on the disk (35; 135) of said slinger rotor (30; 130).

4,978,070

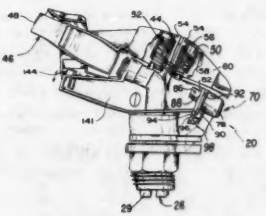
PULSATING SPRINKLER

Ho Chow, Cliffside Park, N.J., assignor to Hunter-melnor, Inc., Moonachie, N.J.

Filed Aug. 11, 1989, Ser. No. 392,737

Int. Cl.[5] B05B 3/04

U.S. Cl. 239—230 15 Claims



1. A step-by-step sprinkler capable of full or part-circle operation, said sprinkler comprising:

a bushing assembly adapted for connection to a fluid source,

a sprinkler body mounted on said bushing assembly and being rotatable relative thereto in either direction,

an impact arm mounted on said sprinkler body for driving the rotation of said sprinkler body,

trip means pivotally mounted on said sprinkler body for reversing the direction of rotation of said sprinkler body when tripped,

spaced adjustable sector stops mounted on said bushing assembly for respective engagement with said trip means and for defining limits of a part circle operation of the sprinkler,

said trip means including

trigger means movable (1) between said sector stops for engagement with respective sector stops so as to reverse direction of rotation of said sprinkler body upon contact with said sector stops and (2) being movable to a position located spaced from planes defined by said sector stops for continuous circular rotation of said sprinkler body,

latch means engageable with said impact arm for limiting rotation of said impact arm so that a direction of rotation of said sprinkler body is reversed when said trigger means is located between said sector stops, and

control means engagable with said sprinkler body for maintaining said trigger means in a fixed position until said trigger means is manually moved or moved by engagement with respective sector stops to a different position at which said control means maintains the different position,

said trigger means, said latch means and said control means being joined to a common pivot mounted on said sprinkler body for simultaneous movement of said trigger means, said latch means and said control means.

4,978,071

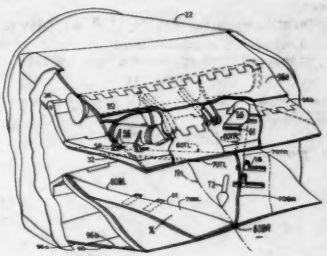
NOZZLE WITH THRUST VECTORING IN THE YAW DIRECTION

Malcolm K. MacLean, Mason, and Mark E. Daniels, Hamilton, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Apr. 11, 1989, Ser. No. 336,405

Int. Cl.[5] F02K 1/12

U.S. Cl. 239—265.19 7 Claims



1. A thrust vectoring apparatus for directing exhaust flow of the nozzle comprising:

top and bottom divergent flaps, a set of corresponding right hand and left hand deflector flaps hinged to each of said divergent flaps so that each deflector flap of said set is rotatable about a corresponding line essentially on the flow surface of said divergent flap and wherein the corresponding lines on each of said flaps are angled with respect to each other, and

means for deploying said deflector flaps into and at an angle to the direction of the exhaust flow.

4,978,072

GRAVITY FEED AIRBRUSH

Benedict Kurowski, Des Plaines, Ill., assignor to Paasche Airbrush Co., Harwood Heights, Ill.

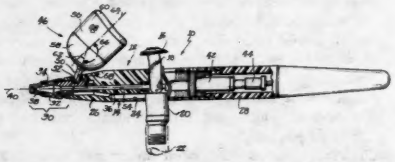
Filed Aug. 16, 1989, Ser. No. 395,365

Int. Cl.[5] B05B 7/30

U.S. Cl. 239—346 9 Claims

1. An airbrush with a fluid cup wherein said cup is removably retained on said airbrush and adapted for containing and delivering fluid to be applied by said airbrush when combined with a compressed gas, said cup comprising: a reservoir portion and a tube portion, said reservoir portion having a hollow body for retaining said fluid disposed therein; one end of said tube portion being non-concentrically fixedly attached to said

bottom of said reservoir, another end of said tube portion distal said reservoir being removably rotatably insertable into a bore formed in a top side of said airbrush non-parallel and non-perpendicular to a major axis extending through said airbrush for rotating said cup to prevent blocking the line of sight of a user



and accommodating left and right handed users; said cup positioned on said top side of said airbrush such that fluid retained in said reservoir is fed into said airbrush through said tube portion attached thereto under force of gravity from either side of said airbrush.

4,978,073

APPARATUS FOR PNEUMATICALLY DISCHARGING LIQUIFIED BUILDING MATERIAL CONTAINING A HARDENER

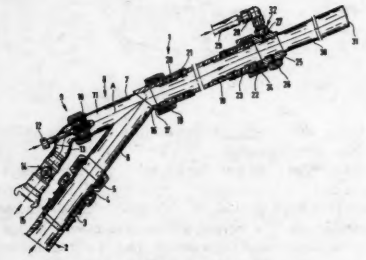
Karl-Ernst von Eckardstein, Unna, Fed. Rep. of Germany, assignor to Friedrich Wilh. Schwing GmbH, Herne, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 190,769, May 6, 1988, abandoned, which is a continuation of Ser. No. 879,095, Jun. 26, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 273,131

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1985, 35231432

Int. Cl.[5] B05B 7/04

U.S. Cl. 239—419.3 **5 Claims**



1. A manually maneuverable means of discharging air-entrained liquified building material containing a hardener comprising:

an aeration fitting having a first conduit connected to a source of building material in liquified flowable condition an d a second conduit having an inlet end connected to a source of compressed air and a discharge end and into which between said ends said first conduit merges;

a discharge nozzle for the mixture of air and entrained building material spaced from the merger of said first and second conduits;

a source of liquid hardener;

injection means in said nozzle for introducing liquid hardener from said source of liquid hardener perpendicularly into the mix passing through a wall of said nozzle;

said source of liquid hardener including a compressed air conduit connected to a source of compressed air, liquid hardener atomizing means connected to said liquid hardener source and said compressed air conduit for atomizing liquid hardener by compressed air and conveying means for conveying a dispersion of fine particles of liquid hardener in air from said atomizing means to said injection means; and

said liquid hardener atomizing means including a chamber having a restricted portion downstream said compressed air conduit, discharging means for discharging liquid hardener into said restricted portion and an expanded portion adjacent to and downstream of said restricted portion, said expanded portion having a cross-sectional area that is substantially larger than that of said restricted portion.

4,978,074

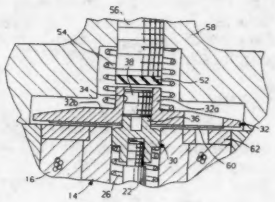
SOLENOID ACTUATED VALVE ASSEMBLY

Louis H. Weinand, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,508

Int. Cl.[5] F02M 51/00

U.S. Cl. 239—585 **9 Claims**



1. A solenoid actuated valve assembly for controlling delivery of a fluid, the assembly comprising a valve seat, a valve engageable with the valve seat to terminate fluid delivery, a solenoid coil, an armature effective to displace the valve from the seat when the coil is energized, and a valve return spring effective to engage the valve with the seat when the coil is de-energized, and wherein the armature separates from the valve as the valve engages the seat whereby the kinetic energy of the armature is not dissipated by engagement of the valve with the seat.

4,978,075

SOLVENT RESISTANT ELECTROSTATIC SPRAY GUN

Robert J. Lind, Robbinsdale, and Stanley G. Karwoski, Oakdale, both of Minn., assignors to Graco Inc., Minneapolis, Minn.

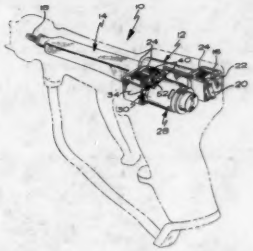
Division of Ser. No. 366,608, Jun. 15, 1989, abandoned, and Ser. No. 225,159, Jul. 28, 1988, abandoned. This application Dec. 6, 1989, Ser. No. 446,879

Int. Cl.[5] B05B 5/02

U.S. Cl. 239—690 **3 Claims**

1. The electrostatic spray gun comprising an air-powered self-contained power supply comprising an air-powered turbine, an alternator and electronic components which include electrical contact points, a voltage regulator and a voltage multiplier, the improvement comprising at least one of said electronic components comprising a fluid impervious heat sink

member and said electronic components being completely potted in solvent resistant material with only said fluid impervious heat sink and electrical contact points extending through said solvent resistant potting material.



4,978,076

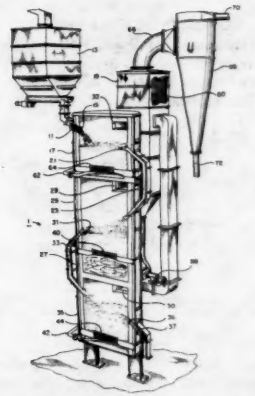
METHOD FOR SEPARATING HAZARDOUS SUBSTANCES IN WASTE FOUNDRY SANDS

Robert S. L. Andrews, and Gerald J. Reier, both of Fort Worth, Tex., assignors to GMD Engineered Systems, Inc., Fort Worth, Tex.

Filed Mar. 28, 1990, Ser. No. 500,480

Int. Cl.[5] B02C *21/00*

U.S. Cl. 241—5 **14 Claims**



1. A method for separating hazardous substances including heavy metals in waste foundry sand, the sand also having organic and inorganic binders adhering to the grains thereof, the method comprising the steps of:

passing the waste sand to a preheat chamber wherein the sand is heated to a temperature and for a time sufficient to oxidize organic binders present on the surface of the sand grains in the waste sand;

passing the sand from the preheat chamber with the inorganic binders still adhering thereto to a calcining chamber, the temperature of the sand in the calcining chamber being maintained at a temperature and for a time sufficient to delaminate any inorganic binders present without fusing the inorganic binders to the surface of the sand grains, thereby releasing any heavy metals trapped in the inorganic binders as metallic dust;

separating the released metallic dust from the remaining calcined sand in the calcining chamber;

passing the calcined sand from the calcining chamber to a cooling chamber; and

discharging the sand from the cooling chamber to a pneumatic attrition clay de-duster to remove any residual inorganic binders from the surface of the sand grains in the calcined sand.

4,978,077

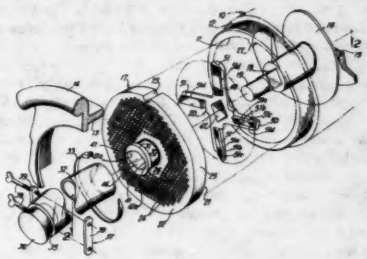
APPARATUS AND PROCESS FOR SEPARATING BONE FRAGMENTS, GRISTLE AND SINEWS FROM MEAT AS THE MEAT IS BEING GROUND

Patrick H. Huebner, Le Mars; Joseph G. Sebranek; Dennis G. Olson, both of Ames, all of Iowa, and Eugene A. Anderson, College Park, Ga., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

***Continuation of* Ser. No. 258,169, Oct. 14, 1988, Pat. No. 4,928,892. This application Jan. 2, 1990, Ser. No. 459,437**

Int. Cl.[5] B02C *18/36*

U.S. Cl. 241—30 **9 Claims**



1. A process of separating bone from meat as the meat is being ground comprising:

(a) urging meat containing bone against the inner surface of a chopper plate having a plurality of small holes therein and an essentially unobstructed conical outwardly tapering passageway surrounding a shaft in its central portion;

(b) passing successive blades in a rotary path around the axis of said shaft and along said inner surface and over said small holes in said plate with the edge of the blades disposed angular to the radius of said axis for chopping meat urged into said small holes and separating said bone from said meat and directing substantially all of said bone inwardly toward said unobstructed inner end of said passageway;

(c) progressively passing said bone directly from said blades radially inwardly into and through the progressively narrowing path of said passageway;

(d) progressively passing the bone which has been passed through said passageway, from the smaller end of said passageway directly in an axial path adjacent to said shaft outwardly away from said passageway and along the outer periphery of said shaft; and

(e) thereafter, discharging said bone from said axial path.

4,978,078

APPARATUS FOR DEHUSKING GRAIN

Laszlo Vadnay, 4 McPherson Street, Banksmeadow, N.S.W., Australia

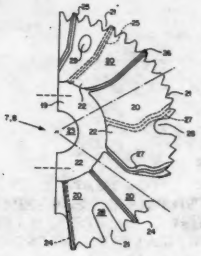
PCT No. PCT/AU88/00013, § 371 Date Aug. 29, 1989, § 102(e) Date Aug. 29, 1989, PCT Pub. No. WO88/05339, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 27, 1988, Ser. No. 399,561

Claims priority, application Australia, Jan. 27, 1987, P13758

Int. Cl.[5] B02C *9/00, 19/22*

U.S. Cl. 241—74 **6 Claims**



1. In an apparatus for dehusking grain wherein a helical screw having a central bore therethrough is rotatably and concentrically mounted on a generally horizontal axis within an at least partly cylindrical housing, wherein means is provided to rotate the screw within the housing, wherein unhusked grain is introduced into a first end of the housing, is dehusked and moved through the housing by the screw and is discharged from a second end of the housing as dehusked grain; the improvement wherein:

(a) the helical screw is made up of a plurality of discoid elements, each side of each discoid element being formed to provide a number of shallow compartments, each compartment being partially defined by a pair of substantially radially disposed ribs extending away from the surface of said discoid element;

(b) each such compartment has an open end adjacent the outer periphery of the discoid element and a closed end adjacent the central bore of the helical screw;

(c) the compartments are disposed so that those on one side of a discoid element are staggered and offset with respect to the compartments on the other side;

(d) each of the discoid elements is provided with an array of dehusking elements upon its helical surfaces; and

(e) grain impelled through the cylindrical housing is subjected to agitated, turbulent flow by contact with the discoid elements of the helical screw thereby removing husk material from the grain.

4,978,079

SHREDDER-MIXER

Harry Murphy, 2175 NW. 69th, Oklahoma City, Okla. 73116

Filed Jan. 23, 1990, Ser. No. 468,530

Int. Cl.[5] B02C *13/286*

U.S. Cl. 241—81 **6 Claims**

1. A machine for preparing soil mixes and the like, comprising:

a frame;

a hopper mounted on the frame for receiving the materials to be mixed;

a housing on the frame forming a shredding chamber;

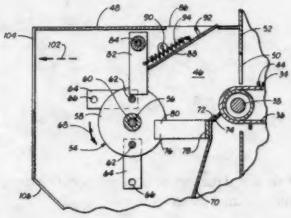
a conveyor forming a live bottom for the hopper and having its discharge end extending into the shredding chamber for conveying the materials to be shredded into the shredding chamber;

a shaft extending across the shredding chamber at a right angle to the conveyor and spaced from the discharge end of the conveyor;

means for turning the shaft in the same direction as the discharge end of the conveyor;

a plurality of hammers pivotally carried by the shaft in spaced apart relation along the length of the shaft;

a spring-loaded bar pivotally secured to the housing in the shredding chamber extending downwardly between the paths of movement of each adjacent pair of hammers; and



a horizontally extending bar secured in the housing in the shredding chamber between the shaft and the discharge end of the conveyor extending from between the paths of movement of the hammers to substantially the discharge end of the conveyor at a level below the discharge end of the conveyor, said horizontally extending bars being positioned to retard the bypassing of material around the hammers.

4,978,080

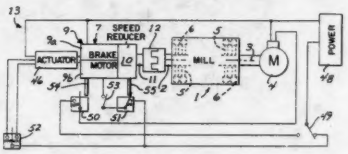
ROTOR INDEXING SYSTEM

Maurice E. Weitekamp, Fox Point, Wis., assignor to Weimer Bearing & Transmission, Inc., Menomonee Falls, Wis.

Continuation-in-part of Ser. No. 324,191, Mar. 16, 1989, abandoned. This application Jan. 17, 1990, Ser. No. 466,519

Int. Cl.[5] B02C *13/30*

U.S. Cl. 241—101.2 **10 Claims**



1. In a hammer mill or the like having a massive high inertia hammer-carrying rotor (5) and a longitudinally extending rotatable output member (2) defining an axis (3), apparatus for rotatably indexing said rotor, comprising:

(a) a rotor indexing drive assembly (7) disposed at one end of said output member and with said drive assembly including:

(1) a relatively high speed low torque indexing motor (9*b*),

(2) a speed reducer (10) connected to said motor and with said speed reducer having a relatively low speed high torque output shaft (11),

(b) power transmitting engageable coupling means (12,12*a*) disposed between said speed reducer and said output member, and with said coupling means including:

(1) a first coupling member (14,56) fixedly and coaxially connected to the said one end of said output member,

(2) and a second coupling member (15,58) mounted to said speed reducer output shaft and normally being spaced from and adapted for releasable engagement with said first coupling member to engage said coupling means,

(c) a normally engaged brake (9*a*) connected to said motor (9*b*) and with said brake being automatically disengaged when said motor is energized for indexing said output member and said rotor through the engaged coupling means,

(d) said rotor indexing drive assembly (7,7*a*) being fixedly mounted on a longitudinally movable bed (41,41*a*),

(e) means for moving said bed so that said second coupling member (15,58) is selectively engaged with or disengaged from said first coupling member (14,56),

(f) said first and second coupling members comprising first and second matable coupling bodies (14,15), and with each said body including an annular base and a plurality of circumferentially spaced jaws (18,22) forming longitudinally extending recesses (24,25),

(g) alignment means to align said first and second bodies as they are caused to be engaged by said bed moving means,

(h) said jaws (18,22) being provided with flat outer ends (34,37) which merge at each jaw side into bevelled surfaces (35,38), said bevelled surfaces merging into longitudinally extending working surfaces (36,39),

(i) said bevelled surfaces forming said alignment means as said coupling jaws are engaged,

(j) a pilot shaft (26) secured to said output member (2) and mounting said first coupling body (14),

(k) said pilot shaft having a tapered terminus end (32) and entering said recess (25) of said second coupling body (15) upon engagement of said bodies,

(l) and said tapered terminus end forming said alignment means as said coupling bodies are engaged to compensate for temperature caused distortion.

4,978,081

METHOD AND APPARATUS FOR DISPOSING THE YARN END OF A PACKAGE IN A FURTHER HANDLING DISPOSITION

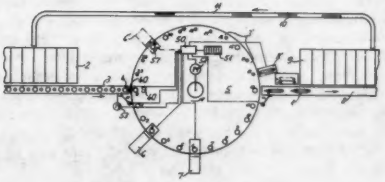
Wilhelm Kupper, Wegberg, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany

Filed Oct. 2, 1989, Ser. No. 415,881

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1988, 3833258

Int. Cl.[5] **B65H** *54/22, 54/20;* **D01H** *9/18*

U.S. Cl. 242—35.50 R **20 Claims**



1. An apparatus for disposing the yarn end of each of a plurality of packages in a further handling disposition, each package being of the type having yarn built onto a tube and some of the packages having their yarn ends in a preferred preliminary disposition and other of the packages having their yarn ends in a disposition displaced from the preferred preliminary disposition, comprising:

means for preliminarily repositioning the yarn ends of packages having displaced yarn ends from a displaced disposition to the preferred preliminary disposition;

means for relocating the yarn ends of packages having yarn ends in the preferred preliminary disposition from the preferred preliminary disposition to the further handling disposition;

means for selectively operating said preliminary repositioning means to preliminarily reposition the yarn ends of only those packages having displaced yarn ends; and

means for advancing packages between said preliminarily repositioning means and said relocating means.

4,978,082

BOBBIN HOLDER

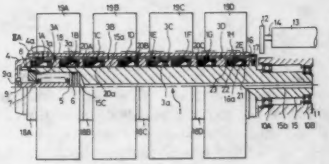
Takami Sugioka; Toshiyuki Ueno, both of Matsuyama; Toshihiro Yudate, Ehime, and Koji Kobayashi, Matsuyama, all of Japan, assignors to Teijin Seiki Co., Ltd., Osaka, Japan

Filed Mar. 20, 1989, Ser. No. 326,883

Claims priority, application Japan, Mar. 29, 1988, 63-75512; Apr. 30, 1988, 63-108417

Int. Cl.[5] **B65H** *54/547*

U.S. Cl. 242—46.4 **3 Claims**



1. A bobbin holder which comprises a rotatable support member, devices for holding bobbins, and cylindrical members engaging with said bobbin holding devices, said bobbin holding devices and said cylindrical members being alternately inserted onto said rotatable support member,

each of said cylindrical members having grooves formed at inner surfaces thereof near longitudinal ends thereof,

each of said bobbin holding devices comprising:

a first inclined member which has an inner surface engaging with said rotatable support member, an inclined outer surface and flange portions formed at ends thereof for engaging with grooves formed at adjacent ends of said cylindrical members; and

a second inclined member which has an inclined surface engaging with said first inclined member, an outer surface engaging with an inner surface of a bobbin, and a flange portion formed at an end opposite to said inclined surface thereof and engaging with one of the grooves of said cylindrical members,

said first inclined member being substantially divided into a plurality of small pieces in a circumferential direction,

said second inclined member comprising a plurality of pieces substantially separated in a circumferential direction, and

said pieces of said second inclined member engaging with said small pieces of said first inclined member, respectively, when said inclined surfaces are engaged with each other.

4,978,083

REEL HOLDER FOR RETAINING REELS OF VIDEO FILM

Jae Hwan Kim, Chungchongnam, Rep. of Korea, assignor to SKC Limited, Kyongki, Rep. of Korea

Filed Nov. 29, 1988, Ser. No. 277,563

Claims priority, application Rep. of Korea, Jan. 25, 1988, 88-575

Int. Cl.[5] **B65H** *75/18*

U.S. Cl. 242—56.9 **7 Claims**

1. A device for use in manufacturing reels of video film comprising:

a drive shaft;

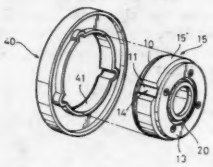
a plurality of sleeves fixedly mounted on said drive shaft;

a plurality of reel holders each mounted on a corresponding sleeve, each reel holder having an annular rim;

bearing means interposed between said reel holders and said corresponding sleeves;

brake means disposed in each of said sleeves and adjacent to a corresponding reel holder of said sleeve;

a holder cover fixed on each reel holder on a side opposite said annular rim, said holder cover and said annular rim defining an annular recess therebetween, said annular rim and said holder cover having a diameter greater than a diameter of said annular recess;



a rubber pad is fitted around each said annular recess;

a leaf spring disposed around each said rubber pad, the leaf spring having an outer diameter greater than the diameter of said annular rim and said holder cover so that when a reel hub is fitted around said reel holder, said leaf spring tensilly urges against an inner peripheral surface of the reel hub thereby retaining the reel hub in a stable position.

4,978,084

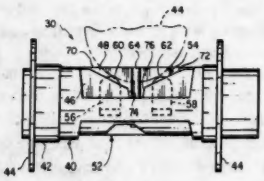
SPOOL FOR PHOTOGRAPHIC FILM OR OTHER WEB MATERIAL

Clark E. Harris, and Joel R. Shaw, both of Fairport, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 21, 1989, Ser. No. 396,268

Int. Cl.[5] B65H *75/28*; G03B *17/26*

U.S. Cl. 242—74 **11 Claims**



4. In a spool for a strip of web having spaced apertures in an end portion of the web for attaching the web to the spool, the spool having a core with an outer surface on which the web can be wound, first and second spaced walls extending through the core and defining a slot, the facing surfaces of the walls being generally parallel to each other, the slot having an entrance end for receiving the end portion of the web and an exit end, a pair of spaced hooks projecting from the first wall into the slot for engagement with the apertures in the web to attach the end portion of the web to the spool, the hooks each having a tip end facing the exit end of the slot and spaced from the first wall so that the end portion of the web can be received between the tip end and the first wall when the web is being attached to the spool, at least one rib projecting from the second wall for urging the web toward the hooks as the web is inserted into the slot, the rib extending from the entrance end of the slot toward the exit end of the slot between the hooks, the rib being adjacent the hooks and spaced from the first wall, and the spool having flanges projecting from end portions of the core, the flanges having a thickness slightly smaller than the spacing between the rib and the first wall, the tip ends of the hooks being sufficiently close to the first wall so that the tip ends of the hooks block a flange of a similar spool from entering the space between the first wall and the tip ends of the hooks, the improvement comprising;

the first wall having a V-shaped edge at the exit end of the slot defining a large obtuse angle, the edge having portions that are tapered inwardly from near the outer surface of the core and adjacent the side edges of the wall toward the entrance end of the slot and the center of the slot, the tip ends of the hooks nearest the exit end of the slot being substantially aligned with the edge of the tapered portions of the first wall and being close enough to the rib to prevent a spool flange of a similar spool from becoming locked between the rib and the first wall during bulk handling of a plurality of such spools.

4,978,085

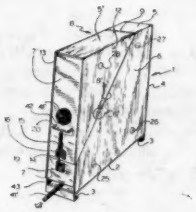
WIRE-DISPENSING SPOOL AND CASING

Bernard Letourneau, 1365, du Palais Avenue, St-Joseph de Beauce, Canada G0S 2V0

Filed Nov. 24, 1989, Ser. No. 440,746

Int. Cl.[5] B65H *16/00*

U.S. Cl. 242—85 **12 Claims**



1. A casing and spool for dispensing resilient wire, comprising a casing portion including a bottom, two opposite side walls each having an upwardly, rearwardly inclined top edge, a rear wall, a front wall portion, a top wall portion a diagonally-oriented cover pivoted to said casing portion and openable upwardly rearwardly of said casing portion; pivot means to open and close said cover; said casing portion and said cover defining a box-shaped casing with four corners when said cover is in closed position; four transverse roller means mounted in said casing, one in each of the three casing portion corners and one in the cover corner; said spool being formed of two half-sections each having a drum portion having a flat inner face and an outer annular flange rollingly engageable with said roller means in said casing; means to detachably join said two spool half-sections together; anti-movements means to prevent relative movement of the two spool half-sections; said spool being adapted to be loaded with a coil of said resilient wire; said front wall portion being provided with a lower slot through which said wire may pass whereby said wire may be easily unwound from and rewound in said casing.

4,978,086

DEPLOYMENT OF TOWED AIRCRAFT DECOYS

Lyndon R. Spicer, Gwent, Great Britain, assignor to Stc Plc, London, United Kingdom

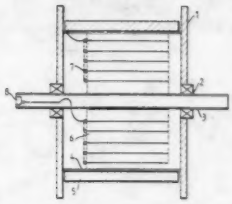
Filed Jul. 20, 1989, Ser. No. 382,282

Int. Cl.[5] B65H *75/48*

U.S. Cl. 242—107 **1 Claim**

1. An arrangement for the deployment of towed aircraft decoys comprising a reel with a hollow hub or flange rotatably mounted on a support, the reel being wound with a composite tether-wire consisting of an optical fiber cable reinforced with a strain member, one end of the tether-wire being anchored to the hub or flange, and within the hub or flange a flat spiral spring member one end of which is anchored to the hub or flange and the other end of which is anchored to the support,

the spring member having bonded to one edge thereof a flexible non-reinforced optical fiber such that the fiber conforms to the configuration of the spring when the spring is wound or unwound according to rotation of the reel relative to the support, the flexible fiber being connected at one end with the anchored end of the optical fiber cable on the hub of flange and at the other end with an optical connector means on the support, whereby unreeling of the tether-wire results in rotation of the reel and consequent winding of the spring.



4,978,087

ACCELERATION SENSOR FOR VEHICLE-SENSITIVE SYSTEMS

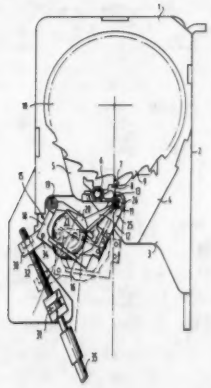
Erhard Tauber, Munich, Fed. Rep. of Germany, assignor to Britax-Kolb GmbH & Co., Dachau, Fed. Rep. of Germany

Filed Nov. 7, 1988, Ser. No. 267,798

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1987, 3738200

Int. Cl.[5] B60R *22/40*

U.S. Cl. 242—107.4 A **15 Claims**



1. An acceleration sensor for vehicle-sensitive systems which is attached to a part connected to a vehicle and comprises a mounting part including a baseplate provided with a spherical socket-shaped recess and bearing means, an impulse lever mounted in said bearing means, said impulse lever being enlarged between the tip thereof and the part thereof mounted in said bearing means and forming a spherical socket-shaped cap, a ball which constitutes an inertia mass located between said cap and said socket-shaped recess, and actuating member consisting of a control pawl located in the vicinity of the tip of said impulse lever and activated by the tip of said impulse lever when said ball is moved out of its position of rest by accelerations having predetermined values, said mounting part being pivoted to a pivoted part of said vehicle on an axis extending through the region in which the tip of said impulse lever contacts said actuating member, and said mounting part being provided with a position control drive responsive to a pivotal movement of said pivoted part of said vehicle said sensor further comprising a screw mechanism attached to the baseplate of the mounting part and to the position control drive through a flexible shaft, said screw mechanism imparting pivotal movement to said mounting part, and movable by changes in the position of the pivoted part of the vehicle, and retaining said baseplate in a substantially horizontal position.

4,978,088

GUIDANCE MECHANISM FOR A SUBCALIBER-SIZED FIN-STABILIZED PRACTICE PROJECTILE

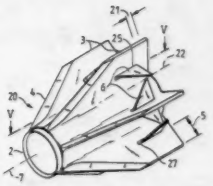
Rainer Himmert, Lauf; Heinrich Brand, Wendelstein; Josef Dommer, and Erich Bock, both of Nuremberg, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Dec. 18, 1989, Ser. No. 452,696

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1988, 3842730; Oct. 4, 1989, 3933100

Int. Cl.[5] F42B *13/20, 13/32, 13/16*

U.S. Cl. 244—3.24 **6 Claims**



1. A guidance mechanism for a subcaliber fin-stabilized practice projectile comprising a plurality of radial vanes fastened circumferentially spaced on a cylindrical body of said guidance mechanism, each of said radial vanes mounting auxiliary vanes extending transversely of the main radial axis of each of said radial vanes, said auxiliary vanes on adjacently arranged radial vanes being alternatingly axially offset by a predetermined distance relative to each other.

4,978,089

PYROTECHNIC SYSTEM FOR PROVIDING AN EMERGENCY EXIT IN AN AIRCRAFT

Bruno Alquier, Blagnac; Olivier Belou, Toulouse; Paul Devienne, Sartrouville, and Thierry Martin, Toulouse, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Jun. 28, 1989, Ser. No. 372,894

Claims priority, application France, Jul. 13, 1988, 88 09574

Int. Cl.[5] B64C *1/32*

U.S. Cl. 244—129.5 **16 Claims**

1. Emergency exit system in a wall of an aircraft, including:

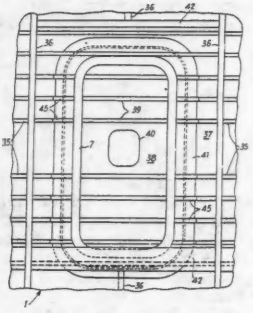
pyrotechnic means disposed against said wall and delimiting the contour of an exit to be provided and able to cut said wall along said contour,

ignition means for said pyrotechnic means,

control means for said ignition means, and

manometric safety means receiving the pressures inside and outside the aircraft and making it possible to firstly inhibit the action of said ignition means when the difference of

the pressures inside and outside the aircraft is above a predetermined threshold, and secondly not prohibiting



control of said ignition means when the difference of said pressures is below said threshold.

4,978,090

REMOTE-HANDLED PIPE SUPPORT

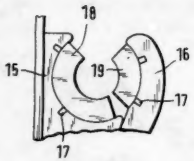
Bernhard Wichert, Neu Anspach, and Klaus-Dieter Peine, Bad Soden, both of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft Für Wiederaufarbeitung Von Kernbrennstoffen mbH, Hannover, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,870

Claims priority, application Fed. Rep. of Germany, Feb. 29, 1988, 3806380

Int. Cl.[5] F16L *3/08*

U.S. Cl. 248—74.1 **6 Claims**



1. A remote-handled pipe support, comprising:

a fixed flat bar;

a bracket having a stationary jaw and being bolted to said fixed flat bar so as to support a pipe to be clamped;

a clamping jaw pivoted to said bracket, said stationary jaw and said clamping jaw defining an upwardly open pipe support, and said stationary jaw having a circle segment surface for contact with the pipe, which surface is of a larger circle segment than a corresponding surface of the clamping jaw and a remote-handled fixing screw for fastening said jaw; and

moving said clamping jaw relative to said stationary jaw;

wherein the pivot of said clamping jaw is arranged below its center of gravity so as to allow said clamping jaw to open by its own dead weight when said fixing screw is loosened.

4,978,091

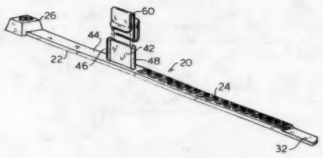
BUNDLING STRAP

Franklin R. Anderson, Durham, and John M. Schroer, Raleigh, both of N.C., assignors to Custom Molders Inc., Durham, N.C.

Filed Feb. 6, 1990, Ser. No. 475,785

Int. Cl.[5] B65D *63/00*

U.S. Cl. 248—74.3 **7 Claims**



1. A bundling strap for enclosing an article such as a wire or group of wires comprising a strap of flexible material having integrally formed along one face thereof a row of rachet-like teeth, an enclosure formed at one end of said strap and projecting in a direction transverse thereto, said enclosure defining therein a passage dimensioned to slidably accommodate the part of said strap which is formed with said teeth, said passage being formed with resilient detaining means engageable with said teeth in such manner as to permit sliding movement of said strap in an entering direction and to prevent sliding movement of said strap in a reverse direction, a substantially flat tab formed intermediate the length of said strap and projecting from said one face in a direction transverse to said strap and in a plane extending lengthwise of said strap, said tab together with said strap and enclosure being molded of a plastic material as an integral piece, and a preformed resilient S-shaped metal clip having a first U-shaped section with an inclined run in surface and a gripping surface formed with barbs and fitted in a gripping and barb/engaging relation on said tab and a second U-shaped section having an inclined run in surface and a gripping surface formed with barbs adapted for being fitted in a gripping and barb/engaging relation on a thin flat support section such as a structural rib to which said strap can be attached by means of said clip.

4,978,092

UNIVERSAL SUPPORT BRACKET FOR ATTACHMENT TO THE BACK OF AN ELECTRICAL BOX

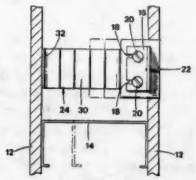
William Nattel, Montreal, Canada, assignor to Commander Electrical Materials, Inc., Ontario, Canada

Filed Dec. 4, 1989, Ser. No. 445,293

Claims priority, application Canada, Jun. 22, 1989, 603685

Int. Cl.[5] A47B *96/00*

U.S. Cl. 248—205.1 **15 Claims**



1. A universal support bracket for attaching varying depths of electrical boxes in hollow wall structures of different depths, the wall structures being formed with a plurality of studs spaced apart with a wall board covering, the bracket comprising:

an elongate strip of sheet material, one end of the strip having a first flange extending substantially perpendicular to

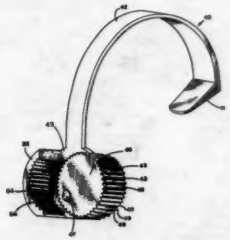
the elongate strip, and having an attachment means therein for connection to the back of an electrical box, and a second flange at the other end of the strip, substantially parallel to the first flange, extending from the other side of the strip to rest on the inside surface of a wall board, and at least one scored bend line across the strip such that a portion of the strip may be bent in the same direction as the second flange, and substantially parallel thereto to accommodate a different depth of electrical box and a different depth of wall structure.

4,978,093

PURSE HANGER

Samuel S. Kennedy, 3730 Briarwood Ave., Las Vegas, Nev. 89121

Filed Apr. 18, 1988, Ser. No. 182,918
Int. Cl.[5] A47B *96/06*
U.S. Cl. 248—205.1 **1 Claim**



1. An article hanger comprising:

(a) flexible connecting means for conforming the shape of the hanger to the shape of the structure to which the article hanger is applied,

(b) a flange member mounted at one end of the connecting means for securing the article hanger to the structure to which the article hanger is applied, said flange member is tapered decreasingly thinner in cross-section toward its end, and

(c) article retaining means at the opposite end of the connecting means for hanging an article therefrom, said article retaining means comprising:

(1) a base portion,

(2) a gripping flange extending outwardly from the base portion and having a concave first gripping surface with a plurality of teeth means, and

(3) a generally circular disk having a plurality of teeth means on its peripheral second gripping surface and rotatably mounted on the base portion, said circular disk being movable between a first retracted position and a second gripping position whereby an article to be retained may be hung between the first and second gripping surfaces.

4,978,094

BRACKET FOR CURTAIN RODS

Alan A. Ford, Sturgis, Mich., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 15, 1989, Ser. No. 436,907
Int. Cl.[5] A47H *1/10*
U.S. Cl. 248—261 **16 Claims**

1. A curtain rod support system comprising:

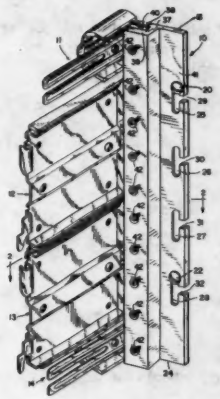
an elongate base bracket;

longitudinally extending flange means on said base bracket, having a surface adapted to engage a wall for attaching said base bracket to said wall;

a longitudinally extending groove in a surface of said base bracket which is perpendicular to the wall, said groove being parallel to said wall-engageable surface;

a plurality of curtain rod brackets;

an inturned mounting flange on each of said curtain rod brackets, each said mounting flange defining a right angle



with the associated curtain rod bracket, and each mounting flange being received within a different longitudinal portion of said groove; and

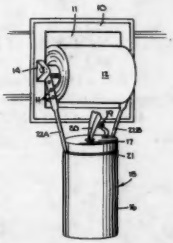
clamping means on said base bracket for clamping said mounting flanges in said base bracket.

4,978,095

HARNESS FOR MOISTENED-TISSUE DISPENSER

Gregory Phillips, Englewood Cliffs, N.J., assignor to Plus Marketing Corp., Fort Lee, N.J.

Filed Jan. 16, 1990, Ser. No. 466,016
Int. Cl.[5] A47K *1/08*
U.S. Cl. 248—312 **6 Claims**



1. A harness for hitching a moistened tissue cylindrical dispenser from a toilet-tissue holder provided with a spring-biased, retractable spindle for supporting a roll of toilet tissue, said spindle having end journals received in bearings on a pair of posts projecting from a holder plate, said harness being formed of a single piece of flexible, synthetic plastic material and comprising:

(a) a hoop adapted to encircle and engage the dispenser; and

(b) a pair of straps integral with the hoop and extending from opposing positions on the hoop, each strap having at least one hole adjacent its free end into which a respective end journal of the spindle is inserted so that the strap is sandwiched between a respective post and the spindle and is

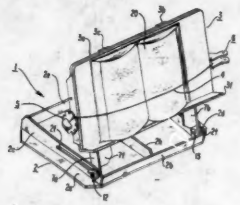
thereby linked to the spindle to suspend the dispenser below the holder.

4,978,096

SUPPORT FOR BOOK AND READING MATTER

Holger Struckmann, 104 S. Alward Ave., Basking Ridge, N.J. 07920

Filed Jan. 26, 1989, Ser. No. 302,186
Int. Cl.[5] A47B *97/04*
U.S. Cl. 248—451 **8 Claims**



1. A support for books and reading matter which comprises in combination:

a baseboard;

a book plate for supporting reading matter;

means for adjusting and securing the angular position of said book plate in relation to said baseboard;

retaining means in contact with said book plate for retaining the pages of said reading matter open against the base of said book plate, said retaining means comprising an elongated non-elastic line extending laterally across the face of said book plate;

a dispensing device for anchoring and dispensing one end of said line disposed at one lateral edge of said book plate; and

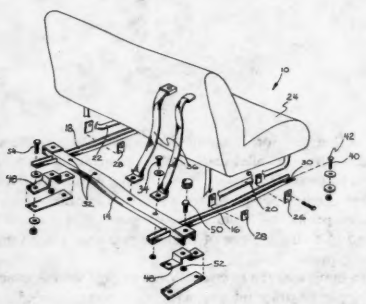
means comprising an elastically-biased hook connected at the other end of said non-elastic line in readily detachable relation adjacent to the other lateral edge of said book plate.

4,978,097

COMBINATION REMOVABLE SEAT FRAME AND SEAT BELT BAR

Andrew Froutzis, P.O. Box 4110, Elkhart, Ind. 46514

Filed Sep. 15, 1989, Ser. No. 407,625
Int. Cl.[5] A47B *97/00*
U.S. Cl. 248—503.1 **2 Claims**



1. A seat frame adapted for removably carrying a vehicle seat, said seat frame including spaced generally parallel frame channel members, a seat belt bar traversing said channel members and serving to connect the channel members to form a one piece unit fastener means for removably mounting said channel members and seat belt bar to a floor, each channel member has a slot adjacent a front edge thereof, securing means including first fasteners each having an enlarged head, and a shank mounted in a floor with said channel member slidable onto said fastener shank through said slot, said securing means further including second fasteners, said second fasteners constituting means for removably securing a rear edge seat frame and seat belt bar to the floor.

4,978,098

ADJUSTABLE SUPPORT

Roger Peckinpaugh, 24605 Wayman St., Santa Clarita, Calif. 91321

Filed Sep. 1, 1989, Ser. No. 401,981
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—523 **4 Claims**

1. A support for a foundation means to secure an ornamental tree including a plurality of radially spaced transversely directed legs, at least one foot for one of the legs, the foot being adjustable in height whereby the location of the leg is adjustable thereby to adjust the position of the foundation means, the foundation means including spike means for interengaging a tree wherein the adjustable foot includes a rod transversely directed relatively to the leg, interlocking means for permitting the engagement of the foot and the legs, the interlocking means including biasing means and a lever, and wherein the legs being an at least partly hollow section having a bottom wall at an end removed from the foundation means and wherein the biasing means is contained within the hollow section, the biasing means being a spring surrounding a portion of the foot extending through the hollow section, and the lever extending essentially in the same transverse direction as the spaced leg and being accommodated at least partly in the hollow section, and at least partly protruding from the hollow section, wherein the spring is positioned between the lever and bottom wall and provides upward pressure in the lever, and wherein the foot is essentially independent of biasing action from the spring, the foundation means includes interengaging spoke means detachably connecting the legs to the foundation means.

4,978,099

CHAMFER STRIP AND ADJUSTABLE CORNER SQUARING STRIP FOR A CONCRETE COLUMN FORM

Michael G. Carlson, Lenexa, Kans., assignor to Western Forms, Inc., Kansas City, Mo.

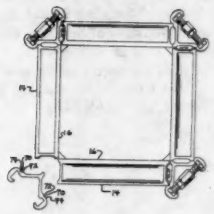
Filed Feb. 7, 1989, Ser. No. 307,893
The portion of the term of this patent subsequent to Dec. 11, 2007, has been disclaimed.
Int. Cl.[5] E04G *13/02*
U.S. Cl. 249—48 **3 Claims**

1. An apparatus for producing a chamfer on a molded concrete column comprising:

(a) four form panels each having side rails and formed into a mold having a rectangular cross section, each said panel defining one wall of a rectangular mold;

(b) at least one chamfer strip along at least one internal, lengthwise corner of said mold, said chamfer strip com-

prising a face for molding a chamfer and having two intersecting side walls, said intersecting side walls forming a corner at the intersecting edges of said walls for fitting into the corner of said mold; and said face comprising a surface formed by joining said side walls; and having an integrally formed tail extending outwardly as an extension from one said side wall and including means for fastening said chamfer strip to a mold panel;



(c) an adjustable corner strip fastened along the outside, lengthwise edge of each intersection of each two adjacent mold panels, said adjustable corner strip comprising respective flange means diverging angularly from a juncture and forming flexible resilient spaced winds, each said wing being for connection to respective side rails of adjoining concrete form panels; and

(d) means for adjusting an angular divergence of said flange means from said juncture, and thereby adjusting angular relationships of adjoining said form panels.

4,978,100

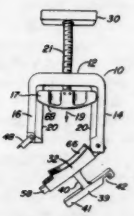
FIRE HOSE CLAMP DEVICE

David L. Peurifoy, 448 Pinetree Way, Riverside, Calif. 92506

Filed Feb. 21, 1989, Ser. No. 312,224

Int. Cl.[5] F16K *7/06;* **B25B** *1/10*

U.S. Cl. 251—8 **5 Claims**



5. A hand-held clamp for a flexible fire hose, comprising:

U-shaped guide means **10** comprising a central wall **12** and two spaced parallel guide walls **14, 16** extending therefrom, each guide wall having a free end spaced from the central wall,

a movable jaw **17** having opposite ends thereof slidably engaging the guide walls, a nut **28** mounted in said central wall, and a rotary screw **21** extending from said movable jaw through the nut, whereby manual rotation of the screw produces slidable movement of the movable jaw toward and away from said central wall,

a stationary jaw **32** having a hinged connection **33** with one of said guide walls near its free end, whereby said stationary jaw can be swung between an operating position extending across the space between the two guide walls and a hose-access position extending away from the movable jaw, said stationary jaw being so configured that when it is in the hose-access position a path is provided for movement of a fire hose into or out of the space circumscribed by the U-shaped guide means,

a handle (at **40, 41**) connected to said stationary jaw to facilitate swinging movement thereof,

latch means **48** carried on the free end of the other guide wall for releasably retaining the stationary jaw in its operating position wherein it extends across the space between the two guide walls,

said other guide wall parallel to the swing axis of the aforementioned hinged connection **33**, and a U-shaped strap **50** having a web wall **54** and two spaced walls **52** connected to opposite ends of said pivot pin, whereby said strap can be manually swung around the pivot pin axis between a latching position and an unlatched position,

said other guide wall having a free end surface extending normal to the axis of said rotary screw **21**, a groove **64** extending within and through said free end surface normal to the pivot pin axis, said stationary jaw having a tip end portion **58** located in the movement path of the U-shaped strap when the stationary jaw is in an operating position, whereby said strap releasably retains the stationary jaw in its operating position, said tip end portion **58** having a side surface thereof engageable against said free end surface, and a tongue **63** projectable from said side surface into said groove **64** so that the groove side surfaces prevent dislocation of the stationary jaw transversely of the groove,

said one guide wall **14** being longer than the other guide wall, whereby that said one guide wall has a free end surface spaced from the central wall **12** a greater distance than said free end surface of said other guide wall,

said stationary jaw having a handle attachment surface located in a common plane with the web wall of the U-shaped strap and the free end surface of said one guide wall when said stationary jaw is in its operating position, and

said latch means comprising a tab **62** extending from the web wall of the U-shaped strap away from said pivot pin **56**, said tab extending normal to said common plane when the latch means is in its latching position wherein the stationary jaw is retained in its operating position,

said tab **62** being freely accessible for finger actuation to swing the strap about the pivot pin axis.

4,978,101

SOLENOID CONTROLLED VALVE OFR LIQUID PREPARATION

Toshitaka Nakaya, Fukui, and Kenji Sumida, Tochigi, both of Japan, assignors to Washi Kosan Co., Ltd., Saitama, Japan

PCT No. PCT/JP88/00440, § 371 Date Dec. 27, 1988, § 102(e) Date Dec. 27, 1988, PCT Pub. No. WO88/08937, PCT Pub. Date Nov. 17, 1988

PCT Filed Apr. 30, 1988, Ser. No. 340,727

Claims priority, application Japan, May 2, 1987, 62-109458; Apr. 5, 1988, 63-84653

Int. Cl.[5] F16K *31/10*

U.S. Cl. 251—129.15 **4 Claims**

1. The combination of a source of a liquid and a solenoid controlled valve for controlling the flow of the liquid comprising:

an electromagnetic drive unit including a plunger to be driven by an electromagnetic force generated by a coil; and

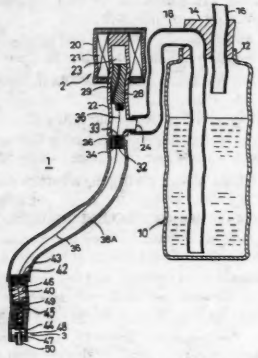
a valve unit separated from said electromagnetic drive unit and including a valve body pressingly contacted with a valve seat by a spring;

said electromagnetic drive unit and said valve unit being connected to each other by a tubular member,

said valve unit being disposed at the tip end of said tubular member,

said valve body and said plunger being connected to each

other by a linear member inserted in and passing thorugh the inside of said tubular member;



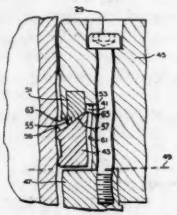
and means defining a conduit communicating between the liquid source and the tubular member for supplying the liquid from the source to the tubular member.

4,978,102

ALIGNING AND SEAL RING RETRACTING APPARATUS FOR PLUG TYPE VALVE

Thomas L. Schuchart, Casselberry, and David B. Berrong, Oviedo, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 26, 1989, Ser. No. 426,825
Int. Cl.[5] F16K 1/46
U.S. Cl. 251—324 7 Claims



1. A valve plug formed to fit within a bonnet cylinder of a steam control valve of a steam turbine and having a pressure seal ring groove for holding a pressure seal ring therein, the seal ring groove comprising an annular groove formed in an outer surface of the valve plug and having a pair of walls and a bottom surface, the improvement comprising:

a slot formed in at least one of the pair of walls of the seal ring groove, said slot being co-extensive with said at least one of the pair of walls and being positioned intermediate of the bottom surface of the groove and the outer surface of the valve plug;

an annular wear ring positioned in said slot and extending substantially co-extensively with said slot, said wear ring being dimensionally taller than the depth of said slot whereby at least a predetermined portion of said wear ring extends above said at least one of the pair of walls in which said slot is formed, said extending predetermined portion of said wear ring terminating in an angular bearing surface; and

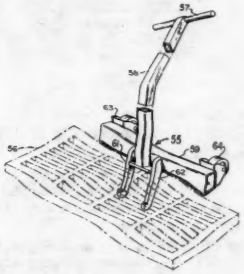
a pressure seal ring positioned in the seal ring groove, said seal ring having an angularly formed bearing surface shaped to mate with said bearing surface on said wear ring, the angle of said bearing surfaces on each of said wear ring and said seal ring being selected to cause inward acting forces upon the seal ring as the valve plug moves rapidly to a closed valve position.

4,978,103

MANEUVERING DEVICE FOR HEAVY FLAT PLATES

Gerald L. Moisan, 12555 N. 75th St., Longmont, Colo. 80501

Continuation-in-part of Ser. No. 93,857, Sep. 8, 1987, abandoned, and a continuation of Ser. No. 156,380, Feb. 16, 1988. This application Apr. 4, 1989, Ser. No. 333,167
The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.
Int. Cl.[5] B66F 11/00
U.S. Cl. 254—131 4 Claims



3. Apparatus for handling flat plates such as grates or manhole covers which have a perimeter for fitting within a casing, and which have upper and lower surfaces with an opening extending therethrough between said surfaces at least at two spaced locations, comprising

an upright elongated column member,

an elongated frame member having a mid portion thereof rigidly attached to the lower end of said column member, with the length of said frame member extending generally normal to the length of said column member so as to position opposite end portions of said frame member on opposite sides of said column member with generally equal spacing from said column member,

a pair of spaced arms attached to said frame member, said arms being attached to said frame member and extending downward therefrom in a direction generally parallel and in the opposite direction to the length of said column member, the spacing between said pair of arms corresponding to the spacing of the opening locations on the flat plate and said column member being located generally midway between said pair of spaced arms,

plate means attached to said frame member at a location generally under said column member, generally midway between said pair of spaced arms, and extending from said frame member in a direction generally normal to said pair of arms, said plate means including means for engaging the ground in proximity to the perimeter of the flat plate when said pair of arms are inserted into the spaced openings of the flat plate and the top of said column member is manually pivoted toward the ground for causing the flat plate to lift upward from the casing which receives the perimeter of the flat plate, and

a pair of spaced wheels attached to said frame member so as to position one wheel on each side of said column member and extending from said frame member in a direction generally normal to said pair of spaced arms, individual ones of said pair of wheels being located on said opposite end portions of said frame member on opposite sides of

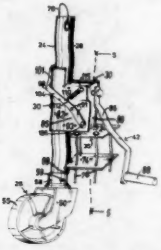
said column member so as to be generally equally spaced from said column member, said pair of wheels being located generally above said plate means and in a position for engaging the ground only in response to continued manual pivoting of said column member toward the ground from the position wherein said plate means has engaged the ground and has caused the flat plate to lift from the casing, said continued manual pivoting of said column member causing said pair of wheels to engage the ground only as a result of said continued pivoting, whereupon said plate means is lifted from ground engagement and said flat plate is adapted to be moved on the ground by operation of said pair of wheels.

4,978,104

QUICK RELEASE JACK

James H. Gipson, Jr., 1010 N. Ella, Searcy, Ark. 72143

Filed May 10, 1989, Ser. No. 349,766
Int. Cl.[5] B60S 9/02
U.S. Cl. 254—420 7 Claims



1. A quick-release trailer jack comprising:

an elongated stanchion comprising a base adapted to contact a supporting surface such as a road;

a rigid rack secured to said stanchion;

a rigid housing slidably mounted upon said stanchion;

clamp means for securing said housing to a trailer tongue;

a drive gear rotatably confined within said housing and normally meshed with said rack, said drive gear comprising an axle extending between and captivated by elongated follower slots defined in opposite sides of said housing;

hand-operated crank means for driving said gear to selectively displace said stanchion relative to said housing when said gear is meshed with said rack, said crank means comprising a worm gear confined within said housing and meshed with said drive gear;

lever means for coupling or uncoupling said drive gear from said rack, said lever means externally associated with said housing and comprising a pivot end pivotally coupled to said housing, and a remote end terminating in a user-accessible handle;

rigid link means for operatively linking said drive gear axle to said lever means intermediate said pivot end and said handle, said link means comprising an anchor end pivotally coupled to said gear axle and a pivot end pivotally coupled to said lever means, and said link means secured to said lever means between said pivot end and said handle and displaceable overcenter to normally maintain said handle in a locked position;

said lever means normally assuming a first position effectuating locking of said rack, and deflectable to a second position to quickly release said gear from said rack to disassociate said stanchion from said housing; and,

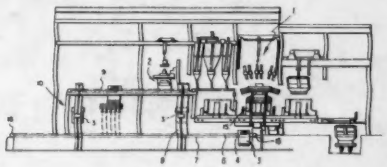
whereby pivoting of said lever means by manually deflecting said handle deflects said link whereby to effectuate movement of said drive gear toward or away from said rack.

4,978,105

STEEL MILL SYSTEM WHICH INCLUDES A METALLURGICAL FURNACE AND A FURTHER PROCESSING SYSTEM

Peter Meierling, Düsseldorf, Fed. Rep. of Germany, assignor to Krupp Industrietechnik GmbH, Duisburg, Fed. Rep. of Germany

Filed Aug. 25, 1989, Ser. No. 399,120
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828962
Int. Cl.[5] C21B 7/00
U.S. Cl. 266—143 12 Claims



1. A steel mill system, comprising:

a metallurgical furnace to produce steel melt;

a further processing system for the steel melt;

a steel ladle having an upper half and a lower half, the upper half of the steel ladle having a carrying mechanism which includes diametrically oppositely disposed running wheels; and

means guiding the ladle for movement along a path having a lower portion with a loading position beneath the furnace and having an upper portion with a processing position adjacent the further processing system, steel melt being loaded into the ladle when the ladle is disposed at the loading position and the steel melt being supplied to the further processing system when the ladle is disposed at the processing position, the means guiding the ladle including rails which carry the wheels and lifting apparatus means for lifting the ladle from the lower portion of the path to the upper portion of the path.

4,978,106

IRON REDUCTION APPARATUS

John J. Kelmar, 2205 Cypress Dr., McKeesport, Pa. 15131

Filed Jul. 27, 1989, Ser. No. 385,688
Int. Cl.[5] F27B 9/16
U.S. Cl. 266—177 10 Claims

1. An apparatus for producing reduced molten iron from process materials including iron ore comprising:

an elongated enclosure means;

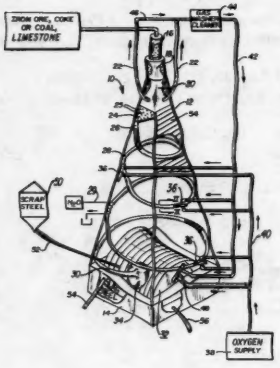
an elongated enclosed flow path extending within said enclosure means and having an inlet end and an outlet end;

said flow path descending vertically substantially continuously from said inlet end to said outlet end;

material feed and guide means cooperable with said inlet end to feed a continuous stream of such process materials into said flow path via said inlet end;

said flow path having a clear working interior space comprised of an elongated uniform cross-sectional area which is coextensive with said flow path continuously throughout the length thereof within said enclosure means; and

burner means associated with said flow path at intervals along the length thereof and operable to direct a blast of



burning process gases in an ascending direction within said clear working interior space.

4,978,107

APPARATUS FOR PRODUCING FOAMED BLAST FURNACE SLAG

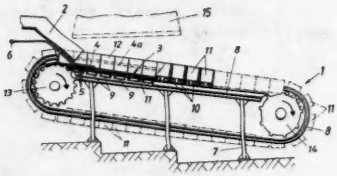
Anton Hulek, Goglerfeldgasse 15, A-4040 Linz; Werner Koller, and Kurt Auer, both of Linz, all of Austria, assignors to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H. and Anton Hulek, both of Linz, Austria, a part interest

Filed Oct. 17, 1989, Ser. No. 422,583

Claims priority, application Austria, Oct. 20, 1988, 2588/88

Int. Cl.[5] C21B 3/06

U.S. Cl. 266—201 **6 Claims**



1. In an apparatus for producing foamed blast furnace slag, comprising

a slag feeder for discharging molten slag,

a conveyor comprising a revolving trough adapted to receive said molten slag from said slag feeder and having adjacent to said slag feeder a bottom and side walls rising from said bottom,

said conveyor being operable to move said trough in a predetermined direction adjacent to said slag feeder,

said trough comprising downstream of said slag feeder an initial foaming portion adapted to hold a layer of said molten slag supported on said bottom, and

stationary water-dispensing means provided adjacent to said slag feeder and operable to supply water into said trough,

the improvement comprising

tubular lance means constituting said water-dispensing means and extending into said foaming portion of said trough, the water-dispensing tubular lance means extending into said layer of molten slag and defining radial water outlet orifices dispensing water into the molten slag layer for foaming the molten slag.

4,978,108

GAS WASHING SINK WITHOUT INTEGRAL CLOSURE MEMBER

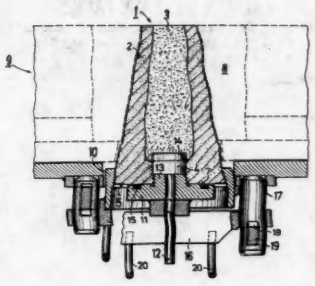
Hans Rothfuss, Taunusstein; Raimund Brückner, Engenhahn-Niedernhausen; Peter Keutgen, Kreuzau; Josef Seeger, Düren; Manfred Winkelmann, Krefeld, and Herbert Metzger, Duisburg, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Weisbaden, Fed. Rep. of Germany

Filed Sep. 28, 1989, Ser. No. 413,671

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1988, 3833502

Int. Cl.[5] C21C 5/48

U.S. Cl. 266—220 **19 Claims**



1. A gas washing sink for use in introducing gas through a metallurgical vessel into molten metal therein, said sink being capable of operation in association with a closure member having a gas inlet connection to enable gas to be supplied to said sink, and said sink being replaceably removably mountable in the metallurgical vessel independently of the closure member, whereby the closure member need not be replaced upon replacement of said sink, said sink comprising:

a gas permeable refractory inner brick portion;

a gas impermeable refractory outer brick portion surrounding said inner brick portion, said outer brick portion being of integral, one-piece construction;

said inner and outer brick portions defining a first sink end to be exposed to the molten metal;

said outer brick portion having an end face defining a second sink end to be directed away from the molten metal;

a gas distribution chamber extending through a part of said outer brick portion and having a first end open to said inner brick portion and a second end opening onto said end face of said outer brick portion and defined thereat by an opening; and

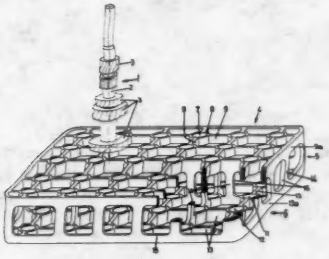
means, associated with said outer brick portion and defining a sealing surface extending concentrically of said opening, for enabling said sealing surface to have pressed thereagainst the closure member, at a pressure sufficient to achieve the sole necessary seal between said sink and the closure member, for sealingly closing said second end of said gas distribution chamber, such that upon removal of the closure member and gas inlet connection said sink may be replaced without the need for replacement of the closure member and gas inlet connection.

4,978,109

UNITARY CONSTRUCTION MULTIDECK TRAY DEVICE FOR HEAT TREATMENT OF SHAFTS OR LIKE MEMBERS

Emile Vigouroux, Arnage, France, assignor to Societe Mancelle de Fonderie, Arnage, France

Filed Dec. 15, 1988, Ser. No. 284,549
Claims priority, application France, Jan. 15, 1988, 88 00451
Int. Cl.[5] C21D 9/00
U.S. Cl. 266—274 6 Claims



1. A heat treating assembly comprising a one piece tray for supporting the lower ends of one set of vertically positioned shaft or elongated members, said tray having only two decks;

an upper said deck provided with a plurality of vertical through holes for supporting and centering lower end portions of all members in said set of vertically positioned shafts or elongated members to be thermally treated in a furnace, said through holes being surrounded by sleeves joined to each other by horizontal ribs in at least two directions;

a lower said deck spaced below the upper deck a distance such that it receives the lower end portions of said members supported and centered on the upper deck, said lower deck being provided with through holes vertically aligned with the through holes in the upper deck; horizontal ribs extending between the holes in the lower deck in at least two directions;

pillars joining said horizontal ribs of the upper and lower decks in such a way as to leave large gaps between said decks for weight reduction and for free circulation of a heating fluid or a cooling fluid therethrough.

4,978,110

FIRE PROTECTION UNBRELLA

Muh Q. Lin, No. 24, Huan Pei Rd., Alley 3, Kuang Ming Li, Chung Li, Tao Yuan Hsien; Pi F. Lin, 3Fl., No. 36, Jenn Fu St., Tao Yuan; Yih J. Lin, No. 36, Kuang Wen St., Tao Yuan; Cheng H. Lin, No. 17, Lane 42, Yung-I St., Tao Yuan, and Ming J. Lin, Tao Yuan Hsien, all of Taiwan

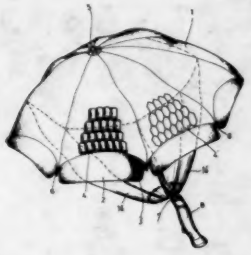
Filed May 14, 1990, Ser. No. 523,866
Int. Cl.[5] A45B 11/00
U.S. Cl. 135—20 3 Claims

1. A fire protection umbrella, comprising:

a folding radial frame comprised of a shaft and a plurality of umbrella ribs, said shaft being covered with a ceramic socket on its top end, said umbrella ribs being each consisted of two steel strips covered with a ceramic socket on its bottom end;

an umbrella cover stretched over said folding radial frame and being made of asbestos cloth coated with fire retarding paint and fully covered with ceramic elements;

a lamp bulb and a flash light respectively mounted on said shaft at its upper and lower ends; and



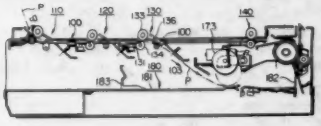
a transparent hood extending downward from said umbrella cover.

4,978,111

RECORDING SHEET STACKING APPARATUS IN IMAGE RECORDING SYSTEM

Akira Kosugi, and Kouichi Hanada, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 18, 1988, Ser. No. 234,025
Claims priority, application Japan, Aug. 25, 1987, 62-211690
Int. Cl.[5] B65H 5/22; G03G 21/00
U.S. Cl. 271—3.1 1 Claim



1. A sheet stacking apparatus for use in an image recording system in which a feeding means feeds recording sheets to an image forming means to record a first image on a first side of said sheets, a conveying means conveys the recording sheets with the first image recorded thereon to a sheet stacking apparatus, and said feeding means delivers said recording sheets from said sheet stacking apparatus to said image forming means to form a second image on a second side of said sheets, said sheet stacking apparatus comprising;

a sheet stacking means having a tray for receiving said recording sheets thereon;

a stopper provided on said tray to stop said recording sheets and align the leading edges of said recording sheets;

a bumper roller which is capable of retractably shifting to a downward position to be in pressure contact with said recording sheets and transport said recording sheets by rotary motion of said roller so that the leading edges thereof reaches said stopper and, an upward position to detach from said recording sheets when said leading edges reach said stopper;

a sensor located upstream from said roller for detecting the passage of said recording sheets through said conveying means and;

a control means for controlling the position of said roller in response to a signal from said sensor so that said roller is shifted downward onto the recording sheets to be aligned when said sheets enter said tray.

4,978,112

SHEET FEEDER FOR PRINTER

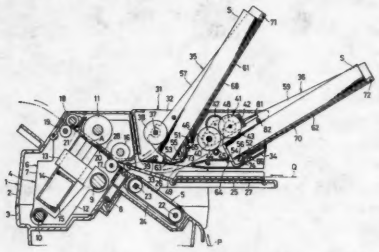
Takeshi Yokoi, Kagamihara, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 11, 1988, Ser. No. 180,125

Claims priority, application Japan, Apr. 10, 1987, 62-55155[U]

Int. Cl.[5] B65H *3/44*

U.S. Cl. 271—9 **8 Claims**



1. A sheet feeder for a printer, said sheet feeder being mounted in said printer for feeding out cut printing sheets one by one to a printing position in said printer and comprising:

first and second sheet accommodation sections for accommodating respective stacks of printing sheets;

first and second feed roller means provided for said respective first and second sheet accommodation sections for feeding out printing sheets from said sheet accommodation sections to said printing position;

a reversible drive motor; and

a selective coupling mechanism for sensing the direction of rotation of said reversible drive motor, selectively coupling said drive motor to either said first or second feed roller means in accordance with the sensed direction of rotation and causing rotation of the selected feed roller means in a feeding direction, wherein:

said selective coupling mechanism includes first and second rotational drive members rotated in unison with said first and second feed roller means, a third rotational drive member rotated in unison with said drive motor, a fourth rotational drive member in engagement with said third rotational drive member at all times and capable of being selectively engaged with said first and second rotational drive members, and a rotation direction sensing member, having two ends, carrying and causing engagement of said fourth rotational drive member with either one of said first and second rotational drive members by sensing the direction of rotation of said third rotational drive member with the rotation of said drive motor; and

said rotation direction sensing member being rotatably mounted at one end for rotation about the axis of said third rotational drive member, and said fourth rotational drive member being rotatably carried at the other end of said rotation direction sensing member.

4,978,113

PICK MECHANISM FOR SHEET FEEDING APPARATUS

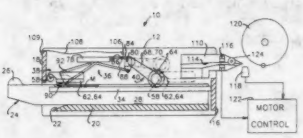
Kenneth A. McAuley, Framingham, and Frank S. Silveira, Norwood, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Sep. 5, 1989, Ser. No. 402,656

Int. Cl.[5] B65H *3/24*

U.S. Cl. 271—10 **16 Claims**

1. In a sheet handling apparatus for separating and feeding individual sheets from the top of a stack of superposed sheets influenced by forces causing the sheets to adhere to one another, each sheet having top and bottom surfaces and front and rear edges, said apparatus including a pick for engaging and lifting the rear edge of each successive top sheet from the remainder of the stack, carriage means supporting said pick for horizontal translating movement including forward movement to advance said pick into engagement with the rear edge of each top sheet while the front edge of that sheet is maintained against movement, thereby to cause the sheet and the pick to



be lifted as the rear portion of the sheet is elevated to a concave arcuate configuration, the improvement comprising:

pick lifting means for elevating said pick during forward translating movement of said carriage means independently of pick lifting movement caused by engagement of said pick with the top sheet in said stack.

4,978,114

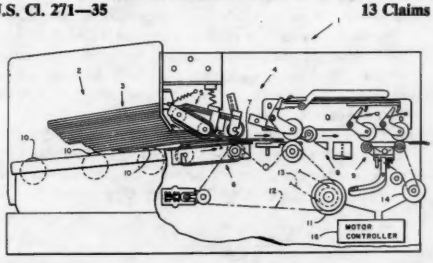
REVERSE BELT SINGULATING APPARATUS

Russell W. Holbrook, Middlebury, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Nov. 14, 1989, Ser. No. 435,912

Int. Cl.[5] B65H *3/52, 3/04*

U.S. Cl. 271—35 **13 Claims**



1. A reverse belt drive assembly mounted to a sheetfeeding apparatus having a deck along which sheet members are caused to traverse in a first direction by a drive assembly, comprising:

a first frame pivotally mounted to said apparatus above said deck and drive assembly, said first frame rotatively supporting a first and second roller in longitudinal spaced apart relationship and having an endless belt extending around said first and second rollers;

a second frame pivotally mounted to said first frame, said second frame rotatively supporting a third roller axially aligned to said first roller and a fourth roller in longitudinally spaced apart relationship from said third roller and having an endless belt extending around said third and fourth rollers;

means for biasing said first and second frame members downwardly against said deck; and,

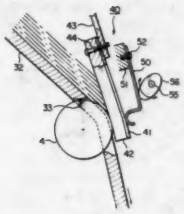
means for causing said rollers to rotate and thereby drive said respective belts to act on said sheet members in a direction counter to said first direction.

4,978,115

AUTOMATIC PAPER FEED DEVICE

Siro Sato, Hachioji, and Shiro Hatakeyama, Tokyo, both of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 302,174
Claims priority, application Japan, Jan. 30, 1988, 63-11715[U]
Int. Cl.[5] B65H 3/56
U.S. Cl. 271—124 5 Claims



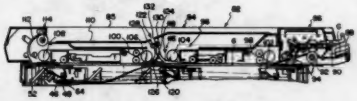
1. An automatic document feed apparatus, comprising:
(a) a separation pad;
(b) at least one feed roller which comes into slidable contact with said separation pad, said roller being driven and transporting a sheet of document pinched between said roller and said pad; and
(c) means for adjusting the force pressing said pad against said roller, including a spring backing said pad and a rotary cam mechanism in pressing engagement with said spring for adjusting the spring force.

4,978,116

SHEET FEEDING APPARATUS

Akihito Tokutsu, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 2, 1989, Ser. No. 317,978
Claims priority, application Japan, Mar. 4, 1988, 63-50904; Mar. 4, 1988, 63-50905
Int. Cl.[5] B65H 29/16
U.S. Cl. 271—291 9 Claims



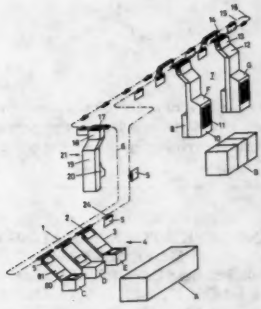
1. A sheet feeding apparatus for feeding each of a plurality of sheets one by one to a predetermined position and discharging the sheet therefrom, comprising:
first and second reversible transporting means, which are essentially co-linear with one another and which are arranged in tandem, for selectively transporting the sheet along them in opposite directions, to feed the sheet to the predetermined position and discharge it therefrom; and
turning means, disposed between the first and second transporting means, for receiving the sheet discharged from the second transporting means toward the first transport means, and then feeding the received sheet to the first transporting means in such a manner than an end of the sheet that is the trailing end when it is received therein becomes the leading end when the sheet is discharged therefrom to the first transporting means, whereby the sheet being discharged from the turning means to the first transporting means is turned over.

4,978,117

APPARATUS FOR CONVEYING PRINTING PLATES

Willy Maier, Kloten; Thomas Bachmann; Martin Konrad, both of Zurich, and Markus Staub, Geroldswil, all of Switzerland, assignors to Daverio AG, Zurich, Switzerland

Filed Apr. 3, 1989, Ser. No. 333,050
Claims priority, application Switzerland, Apr. 8, 1988, 1303/88-7
Int. Cl.[5] B65H 29/04
U.S. Cl. 271—206 14 Claims



1. In a device for conveying printing plates by means of an endless conveyor from a machine for manufacturing the printing plates to a machine for folding the printing plates, the improvement wherein:
the conveyor is a chain conveyor moving on rollers and which can be twisted, and which is guided in a guide rail which is horizontal in straight areas and which hangs at turning zones;
a plurality of grippers are attached to the chain conveyor at spaced intervals, which can be swiveled and opened in a transfer station associated with said manufacturing machine, for receiving a printing plate as one of said grippers moves in said transfer station, and for releasing the received printing plate while moving in an unloading station associated with the folding machine;
said grippers move parallel to an edge of the printing plate to be received; and
the transfer station has connecting links for first swiveling and then opening said grippers to receive the printing plate.

4,978,118

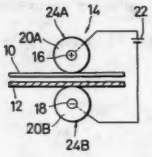
PAPER SHEET TRANSPORTING METHOD THAT APPLIES AN ELECTROSTATIC ATTRACTIVE FORCE BETWEEN A PAPER SHEET AND A REINFORCING INSULATING SHEET PRIOR TO FEEDING

Keiji Kasahara, Kakegawa, Japan, assignor to Abisare Co., Ltd., Kakegawa, Japan

Filed Jun. 13, 1989, Ser. No. 365,302
Claims priority, application Japan, Jan. 13, 1989, 1-6281
Int. Cl.[5] B65H 29/30
U.S. Cl. 271—275 7 Claims

1. A paper sheet transporting method comprising:
a step of superposing a paper sheet on a reinforcing sheet;
a step of affording an electrostatic attractive force between the paper sheet and the reinforcing sheet due to electrostatic charges given to said paper sheet and said reinforcing sheet;
the reinforcing sheet being made of a substance selected from plastics that are of a highly insulating nature and retain the electrostatic charge for a long period of time so as to have a remaining attractive force; and
a step of gripping the thus electrostatically charged paper sheet and the charged reinforcing sheet between a pair of

transporting rollers, and thereby transporting said paper sheet and reinforcing sheet in a tangential direction of said rollers while said sheets are still sticking to each other, whereby the paper sheet is transported by the reinforcing



sheet to a work station therefor without producing any deformation or torsion, wherein the paper sheet is removed form the reinforcing sheet after being processed at the work station.

4,978,119

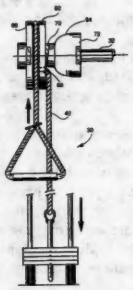
EXERCISING DEVICE FOR SIMULATING ATHLETIC MOVEMENTS

Martin P. Hull, 800 Bear Culch Rd., Woodside, Calif. 94062

Filed Oct. 27, 1989, Ser. No. 428,114

Int. Cl.[5] A63B *31/00, 21/062*

U.S. Cl. 272—71 **15 Claims**



1. An exercising device for simulating athletic movements, the device comprising:

a frame having an upper end and a lower end and the lower end including a base;

a pulley assembly rotatably connected to the frame, the pulley assembly including:

a pulley and a two-stage spool, the spool having a first stage having a substantially greater mechanical advantage than the pulley alone and a second stage having a step function smaller mechanical advantage than the mechanical advantage of the first stage of the spool and the pulley, a pull/resistance means connected to the pulley and spool for rotating the pulley and spool.

4,978,120

RECREATIONAL DEVICE HAVING RINGS

Marvin H. Greenwood, 3444 Wickersham, Houston, Tex. 77027

Continuation-in-part of Ser. No. 255,344, Oct. 11, 1988, Pat. No. 4,896,878. This application Jan. 26, 1990, Ser. No. 470,837

The portion of the term of this patent subsequent to Jan. 30, 2006, has been disclaimed.

Int. Cl.[5] A63G *9/00*

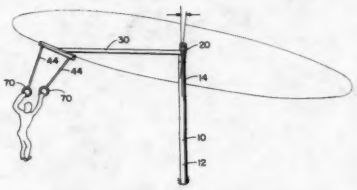
U.S. Cl. 272—85 **15 Claims**

1. A recreational device comprising:

a central support associated at its proximal end with a horizontal plane of reference and having a bearing device mounted at its distal end;

at least one radially outwardly extending cross member mounted at its proximal end to said bearing device for rotation about the longitudinal axis of said bearing device;

a plurality of rings, each ring being suspended from the distal end of said cross member, said bearing device being positioned with its longitudinal axis at an oblique angle relative to said horizontal plane of reference and said cross member being rotatably movable about said longitudinal



axis of said bearing device to describe a circle which circle defines a second plane which second plane is positioned in nonparallel relationship with said horizontal plane of reference; and

a portable base attached to the proximal end of said central support, said base including a rod-like member attached to said proximal end of said central support and bearing two channel members each of said channel members being of U-shaped transverse cross-section and each of said channel members positioned to accommodate at least one tire borne by a vehicle.

4,978,121

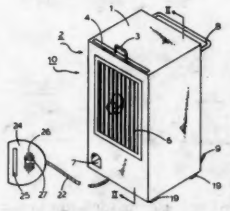
PORTABLE PITCHING PRACTICE SYSTEM

Roger Larkey, 2110 S.W. 22nd, Perryton, Tex. 79070

Filed Apr. 23, 1990, Ser. No. 512,312

Int. Cl.[5] A63B *63/00*

U.S. Cl. 273—26 A **12 Claims**



1. A portable baseball and softball pitcher's practice device comprising:

a rigid housing having vertically top, bottom, front, rear and side walls, said front wall having an opening at an upper portion thereof, a ball penetrating target screen supported by a rigid frame, said frame being placed about said opening such that a ball propelled through said opending will pass through said screen and into said housing, a ball impact energy absorbing panel within said housing attached to said rear wall adjacent said opening and target screen whereby a ball passing through said screen will impact against said energy absorbing panel, a hollow ball collecting trap within said housing and positioned below said screen and said energy absorbing panel, said trap having upper and lower ends and configured to receive and discard a ball rebounding from said pad, said front

wall having a further opening therein adjacent a lower end portion thereof, said further opening communicating with said trap lower end whereby a ball impacting said pad will fall into said trap and exit said housing at said further opening, means defining a pair of retractable wheels, said wheels being attached to a lower portion of said housing, a portable pitcher's mound and a cord of predetermined length, said cord having one of its ends attached to said pitcher's mound and its other end attached to said housing means attached to said cord for adjusting the effective length thereof, and means on said pitcher's mound to identify proper placement of a pitcher's feet.

4,978,122

BARBELL

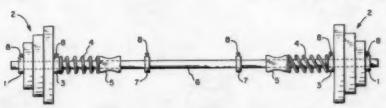
Christian Dibowski, Kehlenweg 4, 7801 Pfaffenweiler, Fed. Rep. of Germany

Continuation of Ser. No. 287,913, Dec. 21, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 443,067

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1988, 8800050

Int. Cl.[5] A63B *21/72*

U.S. Cl. 272—123 **7 Claims**



1. A barbell including a bar, one or more weighted disks mounted on said bar, a safety lock means for preventing said disks from sliding off said bar, a locking ring means secured to said bar adjacent said discs, resilient means having a first end secured to said locking ring means, a handle adapted to contact a second end of said resilient means and being axially movable on said bar to compress or extend said resilient means, and a detent adapted to be secured to said bar for defining an end position for said handle.

4,978,123

RACKET WITH ROTARY CROSSHANDLE

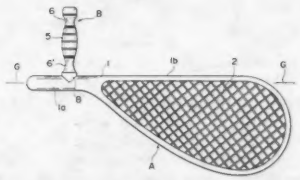
Hiyuki Ashihara, 360-1, 8-chome, Sanbancho, Matsuyama-shi, Ehime-ken, Japan

Filed Jul. 19, 1989, Ser. No. 381,924

Claims priority, application Japan, Jul. 21, 1988, 63-182888

Int. Cl.[5] A63B *49/08*

U.S. Cl. 273—73 R **10 Claims**



1. A racket with a rotary crosshandle, said racket comprising a racket body, the racket body comprising a racket frame and a racket shaft extending from the racket frame, said racket shaft being provided with the rotary crosshandle, said rotary crosshandle being disposed substantially on a plane defined by the racket body and having a length substantially equal to the width of a man's palm; said crosshandle comprising an internal shaft having at least one end thereof secured to the racket shaft, the internal shaft being sheathed with a plurality of grip members, said grip members being stacked relative to each other with rotary interslidability to form an axial length of said crosshandle, at least one of the stacked grip members being mounted rotatable relative to the internal shaft and the remainder of said plurality of grip members being mounted stationary relative to the internal shaft; whereby swing motions of the racket are controlled by manual touch onto the grip members stationary and rotatably mounted relative to the internal shaft.

4,978,124

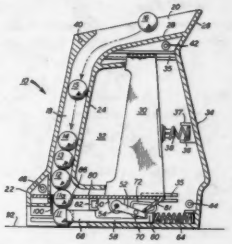
MARBLE SHOOTING TOY

Robert L. Brown, Lakeview; Robert D. Shilen, Tonawanda, and Robert F. Rosnak, Depew, all of N.Y., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 16, 1989, Ser. No. 421,799

Int. Cl.[5] A63B *71/00*

U.S. Cl. 273—129 S **15 Claims**



1. An apparatus for propelling objects over a playing surface comprising:

an upstanding housing, said housing having a lower wall, an opening extending through said lower wall, said opening being of a size to allow said objects to pass through said housing and onto a playing surface, indexing means attached to said housing an spaced from said lower wall for controlling gravitational movement of a said object through said housing and opening said housing having a magazine for holding a plurality of said objects, means for moving said indexing means to thereby release a said object to place said object in firing position on said playing surface when said lower wall is placed such that a said ball is in contact with said playing surface and in firing position on said playing surface, and hammer means intermediate said indexing means and said lower wall for propelling a said object from said firing position and thus along the playing surface.

4,978,125

PORTABLE, HAND AGITATED RANDOM SELECTOR DEVICE

David Trine, 2540 Mountain La., #19, Allentown, Pa. 18103

Filed Jan. 2, 1990, Ser. No. 459,943

Int. Cl.[5] A63F *7/04*

U.S. Cl. 273—144 B **16 Claims**

1. a random selection device comprising:

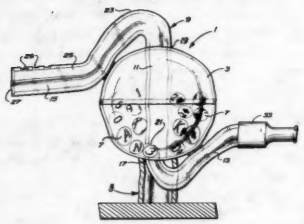
a. a closed, hollow mixing chamber;

b. a plurality of ejectable indicator units in said chamber;

c. tubular fluidic conduit means for conducting a fluid therethrough, said conduit means extending within said chamber and having a first and second end terminating outside said chamber, said second end terminating at a substantially closed end, said conduit means entering said chamber at a first wall portion and exiting said chamber at a second wall portion, said conduit means having an internal passageway large enough to permit said indicator units to pass through the portion extending within said chamber and into said second end but not said first end;

d. aperture means in said conduit portion within said cham-

ber for permitting entry of said indicator units one at a time into said conduit portion for flow therethrough; and



c. means for connecting said first end of said conduit means to a source of fluid pressure to drive said indicator units through said conduit to said second end.

4,978,126

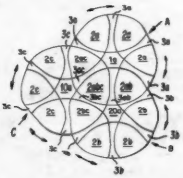
ROTATING AMUSEMENT DEVICE

Leib Morosow, and Moshe Morosow, both of 781 Eastern Parkway, Brooklyn, N.Y. 11213

Filed Nov. 28, 1989, Ser. No. 442,122

Int. Cl.[5] A63F 9/08

U.S. Cl. 273—153 S 10 Claims



1. An amusement device comprised of two or more interlocked circle members positioned along a common plane and having substantially parallel central axes, with each of the circle members being comprised of compositional elements which are rotatable around the central axis of the circle member, wherein a portion of the compositional elements of each of the circle members laterally overlaps a section of at least one other circle member along the common plane, whereby said portion is a common part of both the overlapping circle member and the circle member being overlapped, with each of the circle members being independently rotatable around its own central axis and with the compositional elements of the circle members being thereby rotatable into any or all of the overlapping circle members, wherein each of the circle members is comprised of a fixed central element having the central axis passing therethrough and the circle members further having at least three compositional elements interlocked with the fixed central element and rotatable therearound, whereby the compositional elements are rotatable into the overlapping portions; wherein the fixed central element, and compositional elements are each comprised of three layers, all substantially perpendicular to axes of the circle members, with each of the layers of each of the elements being laterally adjacently complementary in shape to co-planar layers of adjacent elements along said plane, and with the elements being thereby laterally co-fitted, whereby adjacent elements are axially interlocked, wherein the fixed central element is comprised of upper and lower layers connected by a central layer laterally radially extending along said plane from between the upper and lower layers; wherein the compositional elements are each comprised of upper and lower compositional element layers connected by a central compositional element layer extending inwardly from the peripheries of both of the upper and lower compositional element layers thereby defining a spacing between the upper and lower compositional element layers with the spacing being sized to accommodate a portion of the laterally radially extending central layer of the fixed central element therewithin; wherein the circle members have exposed outer peripheral edges which define the spacing between upper and lower compositional element layers, with a frame member closely encircling the exposed peripheral edges to maintain lateral interlocking of all of the elements, with the circle members being freely rotatable within the frame member; and wherein the frame member is sandwiched and fully contained within the spacing between upper and lower element layers of the compositional elements, with the outer peripheral edges remaining exposed for manual manipulation.

4,978,127

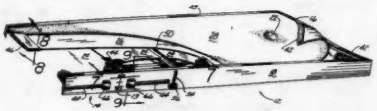
SELECTIVELY CONTOURABLE PUTTING GREEN

Charles H. Juel, Jr., 697 Second St., Stout, Iowa 50673

Filed Mar. 19, 1990, Ser. No. 495,709

Int. Cl.[5] A63B 67/02

U.S. Cl. 273—176 H 21 Claims



1. A selectively contourable putting green comprising:

an elongated platform including a pair of end rails interconnected by a pair of opposing side rails;

a subbase rigidly attached to said platform to form a substantially level surface, said level surface being interrupted by a plurality of transverse slots formed in said subbase and extending between said side rails;

a flexible resilient base including an under side disposed to contact said level surface and an upper side disposed to support a flexible putting surface;

a contour bar including an upper edge and lower edge, said contour bar being received in each of said transverse slots and disposed such that the upper edge is in contacting relationship to a transverse section of the under side of the flexible base, each end of said contour bar being independently selectively adjustable between a first position wherein the upper edge is flush with the level surface of the subbase and a second position wherein the upper edge is fully raised above the level surface of the subbase;

a selectively movable elevation block disposed interior of and parallel to each of said side rails in contacting relationship to the lower edge of said contour bar at each end thereof, each elevation block including, in alternating sequence, a number of inclined surfaces and a number of support surfaces, each of said support surfaces being selectively disposed to engage the lower edge of said contour bar at one end thereof and support it at a discrete elevation; and

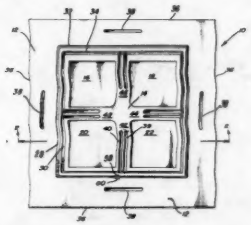
means for selectively moving said elevation block, whereby the position of each elevation block determines the elevation of one end of each contour bar with respect to the level surface of the subbase which in turn determines the elevation of the transverse sections of the base and the overlying putting surface to produce a selected contour of the putting surface.

4,978,128

BOARD GAME

Colleen Holleman, and Gregg Holleman, both of 3646 Espanola, Dallas, Tex. 75220

Filed Sep. 25, 1989, Ser. No. 411,896
Int. Cl.[5] A63F 3/00
U.S. Cl. 273—248 2 Claims



1. A game board and game pieces for a game of skill and chance utilizing dice, comprising; A raised game board playing surface including a peripheral, rectangular double track means and a cross-shaped inner track means intersecting said double track midway between each right angle of said rectangular double track means, trough means defined by quadrants between said cross-shaped inner track means and said peripheral rectangular double track means, thereby forming four such trough means; a "home" position means outside of said peripheral rectangular double track means midway between each right angle of said rectangular double track means, colored game pieces and matching colored dice for playing a game, said trough means has side walls for containing tossed dice, said game board has four playing sides with each playing side having said home position means midway of said side and where each playing side has its trough means to the right of said cross-shaped inner track means, each trough means having a matching color to said game pieces and dice which correspond to said playing side, said colored game pieces includes equal numbers of pieces of a first color and of a lighter shade of the same color, said dice include one die of said first color and another die of said lighter shade of the same color, there being four such different first colors and four such matching lighter shades of the same colors.

4,978,129

ELECTRONIC GAME APPARATUS

Kenichiro Komeda, Gose, and Kenichi Inui, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 471,355, Mar. 2, 1983, abandoned. This application Jul. 29, 1988, Ser. No. 226,520
Claims priority, application Japan, Mar. 3, 1982, 57-34371
Int. Cl.[5] A63F 9/00
U.S. Cl. 273—237 8 Claims

1. An electronic game apparatus comprising:

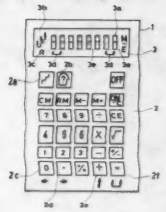
display means for displaying a row comprising a plurality of symbols;

a right-shift input switch and means responsive thereto for effecting a right shift of the entire row of symbols in said display means;

a left-shift input switch and means responsive thereto for effecting a left shift of the entire row of symbols in said display means; and

an exchange input switch and means responsive thereto for exchanging specific symbols in the row of symbols displayed in said display means;

wherein said display means further comprises at least one exchange indicator for indicating which symbols of said



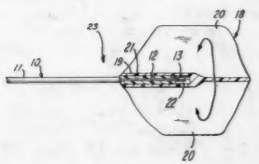
plurality of symbols will be exchanged in response to actuation of said exchange input switch.

4,978,130

DART FLIGHT ROTATION SHAFT AND FLIGHT ROTATION SHAFT ASSEMBLY

Charles W. Farler, 4503 Woodbine Ave., Dayton, Ohio 45420

Continuation-in-part of Ser. No. 868,622, May 29, 1986, abandoned. This application Oct. 14, 1986, Ser. No. 918,719
Int. Cl.[5] A63B 65/02
U.S. Cl. 273—423 5 Claims



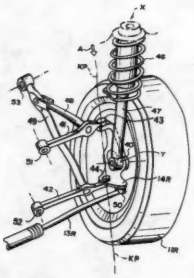
1. A dart shaft-flight assembly comprised of a non-rotating dart flight shaft and a rotatable snap on readily removable dart flight, having a central axis, attached thereto, said shaft having a cylindrical forward portion and a flight mating portion readily separable from said snap-on, readily removable, attached dart flight said dart flight further comprised of a flight bushing tube located along the central axis of said flight, a plurality of vanes or fins equally spaced around said flight bushing tube and an axial cavity whose inner diameter has one or more respective recess(es) and/or extension(s) whose distance(s) and shape conform substantially to respective extension(s) and/or recess(es) on a flight attachment means of said shaft flight mating portion yet leave a gap or a space therebetween permitting said flight to be free to rotate, clockwise or counter-clockwise, around such shaft; wherein said shaft flight mating portion has a means of attachment to said flight around which said flight can rotate freely, clockwise or counter-clockwise, said shaft attachment means having an outer diameter with one or more portions of larger, diameter (extension) and/or smaller diameter (recess) than its remaining portion(s) to enable it to mate at such extension(s) and/or recess(es); and wherein said shaft-flight assembly is characterized in that no portion of said shaft flight attachment means is external to any external surface of said flight.

4,978,131

REAR SUSPENSION SYSTEM FOR FOUR-WHEEL-STEERED VEHICLE

Takeshi Edahiro; Seita Kanai, and Kouichi Ushio, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 27, 1989, Ser. No. 441,696
Claims priority, application Japan, Nov. 28, 1988, 63-298315
Int. Cl.[5] B60G 15/00, 3/00
U.S. Cl. 280—91 9 Claims



1. A rear suspension system for a four-wheel-steered vehicle which is provided with a front wheel turning mechanism and a rear wheel turning mechanism and in which both front and rear wheels are turned in response to the rotation of a steering wheel and at least the outer one of the rear wheels is turned in the same direction as the front wheels when the steering wheel is turned while the vehicle is in a predetermined operating condition, the rear suspension system comprising

a wheel support which supports a rear wheel and is connected to a rear wheel turning rod member of the rear wheel turning mechanism so that the rear wheel on the wheel support is turned about a king pin axis when the rear wheel turning rod member is displaced,

a wheel guide means which is connected to the wheel support and guides the wheel support so that it defines the king pin axis and the rear wheel on the wheel support is turned about the king pin axis in response to displacement of the rear wheel turning rod member, the king pin axis being tilted inward from the vertical with respect to the vehicle body and intersecting the tread of the rear wheel at a point which is offset in the longitudinal direction of the vehicle body from the point at which a side force acts on the rear wheel during cornering, and

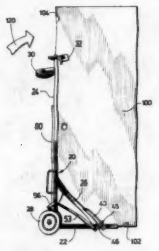
a damping means which is connected between the wheel support and the vehicle body and restrains vertical motion of the wheel support under a counterforce thereof, the damping means being arranged so that the line of action of the counterforce is tilted with respect to the king pin axis so that it is not parallel to the king pin axis, does not intersect the king pin axis and is directed such that the counterforce generates a moment which tends to turn the rear wheel in the direction opposite to the direction in which a moment generated by the side force acting on the outer of the rear wheels tends to turn the outer rear wheel when the vehicle corners.

4,978,132

PIVOTABLE HAND TRUCK APPARATUS

P. Henry Wilson, 4721 E. 146th St., Carmel, and William A. Kelso, 7575 E. Maloney Rd., Brownsburg, Ind. 46112

Filed Sep. 14, 1989, Ser. No. 407,111
Int. Cl.[5] B25H 1/08
U.S. Cl. 280—47.131 14 Claims



1. A pivotable hand truck apparatus for holding and transporting a generally rectangular-shaped object comprising:

a structure for supporting the object by two edges comprising a first support member adapted to support a first edge of said object and a second support member adapted to support a second edge of said object, said second edge being positioned substantially transversely to said first edge, and said first support member being positioned substantially transversely to said second support member and being connected thereto at a point defining an apex;

means secured to said structure adjacent the apex about which the structure may be pivoted between substantially horizontal and vertical positions; and lifting means carried by said structure adapted to vertically adjust the object,

said support structure being adapted to first receive said object while disposed with the second support member and the second edge of the object supported thereby being in substantially horizontal position, said support structure thereafter being adapted to be pivoted about said pivoting means so that said first support member and said first edge of said object supported thereby are disposed in a substantially horizontal position and said second support member and said second edge of said object supported thereby are disposed in a substantially vertical position;

said lifting means being adapted to be thereafter activated to vertically adjust the object to a selected height above a floor surface, said lifting means comprising:

at least one pedal hingedly affixed to said first support member, said at least one pedal having a floor-engaging fulcrum arranged on the underside thereof, said pedal being adapted to be moved between a non-operational position and an operation position;

at least one height-adjusting member carried by said structure; and

means for activating said height adjusting member when said pedal is moved from the non-operational position to the operational position.

4,978,133

TRAILER HITCH SHOCK ABSORBER

Rexford M. Thorne, 4931 S. Center, and David G. Edleman, 715 S. Grant, both of Casper, Wyo. 82601

Filed Oct. 30, 1989, Ser. No. 428,959
Int. Cl.[5] B60D 1/00
U.S. Cl. 280—484 9 Claims

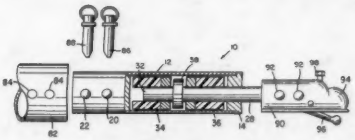
1. A trailer hitch adapter to enable rotation of a hitch-vehicle connection and to absorb shocks caused by sudden changes in fore-and-aft loads on the hitch, said adapter comprising:

(a) an elongated connecting member having a longitudinal

axis and a first end adapted to be connected with one of a coupling ball and a coupling-ball-receiving socket, and the second end spaced from the first end along the longitudinal axis, a laterally outwardly extending projection having a larger radial dimension than the connecting member and defining a pair of axially spaced contact surfaces inclined relative to the housing longitudinal axis;

(b) first and second resilient, tubular bushing bodies carried by the elongated connecting member, each bushing body having an inner end and an outer end, the inner ends of each bushing body positioned adjacent one contact surface of the outwardly extending projection of the connecting member;

(c) a housing for receiving the connecting member and for containing the bushing bodies, the housing having a longitudinal axis and a pair of longitudinally spaced ends and having stop means at each end thereof for retaining the



respective bushing bodies within the housing, one stop means including an opening to slidably receive a portion of the connecting member to permit the first end of the connecting member to extend outwardly of the housing and to move axially and rotationally relative thereto; and

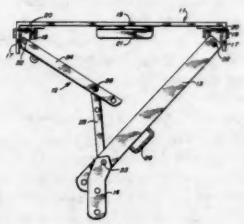
(d) wherein and the housing is adapted to be connected with the other of said coupling ball and said coupling-ball-receiving socket, and wherein the connecting member is received within the housing between the resilient bushing bodies for rotation relative to the housing and for absorbing axial loads imposed upon the portion of the connecting member that extends outwardly of the tubular body member, the second end of the connecting member being freely received within the housing and being confined only by one of the resilient bushing bodies so that it is capable of rotation, translation, and radial movement relative to the housing longitudinal axis.

4,978,134

FOLDABLE TOWING HITCH FOR VEHICLES

Dean R. Dahl, 422 S. Fifth St., Breckenridge, Minn. 56520, and Paul G. Syring, 717 Fourth St. South, Wahpeton, N. Dak. 58075

Filed Aug. 24, 1989, Ser. No. 399,066
Int. Cl.[5] B60D *1/00*
U.S. Cl. 280—491.4 **8 Claims**



1. A foldable towing hitch mountable upon a towed vehicle for towing by a second vehicle comprising:

(a) a frame attachable to said towed vehicle;

(b) a pair of nestable each having two ends arms pivotally attached at spaced-apart points to said frame and extending convergingly therefrom, the first of said arms formed into a bifurcated frame end piece and a hitch end piece, foldable to nest the hitch end piece within the frame end piece for changing the distance between the ends of said arm, said arms pivotally attached together at a hinge point distal from said frame attachment and the second of said arms formed into a second bifurcated frame piece foldable to nest the first arm within the second bifurcated frame piece;

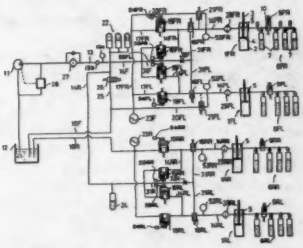
(c) a hitch bracket pivotally affixed to the pair of arms at said hinge point and retaining said arms in a converged relationship, the hitch bracket further having a means for attaching to the second vehicle.

4,978,135

VEHICLE SUSPENSION SYSTEM

Takeshi Edahiro; Hiroyoshi Kumada; Toshiki Morita; Shin Takehara, and Mineharu Shibata, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 6, 1989, Ser. No. 403,561
Claims priority, application Japan, Sep. 8, 1988, 63-225284; Nov. 30, 1988, 63-300856
Int. Cl.[5] B60G *11/26*
U.S. Cl. 280—707 **22 Claims**



1. A vehicle suspension system comprising a liquid piston-cylinder device connected between the vehicle body and a wheel, a liquid passage which connects the liquid piston-cylinder device to a reservoir in which hydraulic liquid is reserved, a liquid pump which is provided in the liquid passage and feeds under pressure the hydraulic liquid in the reservoir through the liquid passage, and a control valve which controls the flow of the hydraulic liquid through the liquid passage, thereby controlling feed and discharge cf the hydraulic liquid to and from the liquid piston-cylinder device in order to control the properties of the suspension, characterized by having

an accummulator which is connected to the high-pressure liquid passage between the liquid pump and the control valve and accummulates the hydraulic liquid under pressure,

a return passage which connects the reservoir to the high-pressure liquid passage between the liquid pump and the control valve,

an on-off valve which opens and closes the return passage, and

a control signal output means which outputs to the on-off valve a closing signal when a switch means is in an on position where it permits the engine of the vehicle to operate, and outputs to the on-off valve an opening signal when the switch means is in an off position where it stops the engine, the closing signal causing the on-off valve to close the return passage and the opening signal causing the on-off valve to open the return passage.

4,978,136

AUTOMOTIVE KNEE PROTECTOR

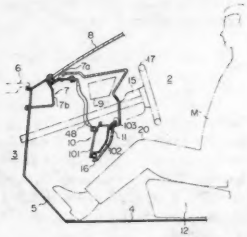
Norihiro Tomita; Toshiteru Yoshimura, both of Aki; Masayuki Kotoh, Hiroshima; Masayosi Ono, Kure; Takayuki Kobayashi, Hiroshima, and Katsunori Monden, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Dec. 18, 1989, Ser. No. 451,566

Claims priority, application Japan, Dec. 19, 1988, 63-318540; Dec. 24, 1988, 63-326482

Int. Cl.[5] B60R *21/04*

U.S. Cl. 280—751 **25 Claims**



1. A knee protector structure mounted on a front body member of a vehicle to face knees of a passenger seated in a front seat for stopping a forward movement of the passenger by the knees to lighten a collision impact applied to the passenger comprising, protecting panel means mounted on the front body member for being brought into contact with the knees in case of collision, the protecting panel means having an upper panel portion and a lower panel portion, the lower panel portion having a rigidity smaller than the upper panel portion so that the lower panel portion is deformed greater than the upper panel portion when the knees are brought into contact with the protecting panel means in case of the collision.

4,978,137

SYSTEM AND METHOD FOR CONTROLLING POSTURE OF STEERING WHEEL FOR VEHICLE

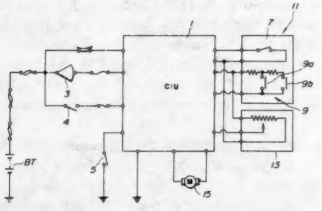
Tohru Futami, and Naoki Yuzuriha, both of Kanagawa, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 6, 1989, Ser. No. 418,043

Claims priority, application Japan, Oct. 6, 1988, 63-250810; Dec. 28, 1988, 63-334672

Int. Cl.[5] B62D *1/18*

U.S. Cl. 280—775 **11 Claims**



1. A system for controlling a posture of a steering wheel for a vehicle, comprising:

(a) a steering wheel system having a steering wheel which can change its posture with respect to a related occupant seat between a first position at which a vehicle driver can handle the steering wheel to drive the vehicle and a second position at which the steering wheel is jumped up to make it easy for the driver to get on and off the vehicle according to situations in which an ignition key is inserted into a corresponding key hole of the vehicle and in which the ignition key is removed from the corresponding key hole;

(b) first means for setting a third position between a lowest limit of the first position and second position, the third position defined as a highest position limit at which the driver can handle the steering wheel;

(c) second means for automatically returning the steering wheel at least to the third position from the second position when the ignition key is inserted into the corresponding hole;

(d) third means for manually operating the steering wheel so as to adjust the steering wheel posture; and

(e) fourth means for limiting the operation the steering wheel by the third means so as to enable the operation thereby only when the steering wheel is placed between the third position and lowest limit of the first position.

4,978,138

VEHICULAR SAFETY ARRANGEMENT FOR DRIVER'S SEAT

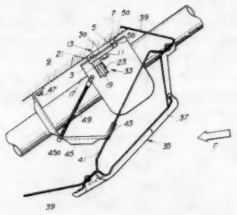
Makoto Hikone, Yokosuka; Kouzo Maeda, Yokohama, and Masanobu Yoshioka, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan

Filed Dec. 6, 1989, Ser. No. 446,742

Claims priority, application Japan, Dec. 16, 1988, 63-162352[U]

Int. Cl.[5] B60R *21/05*; B62D *1/19*

U.S. Cl. 280—777 **8 Claims**



1. A vehicular safety arrangement for a driver's seat to which a steering column extends, said vehicular safety arrangement comprising:

means for axially movably supporting the steering column to side of a vehicle body, said supporting means taking a first condition for allowing axial movement of the steering column and a second condition for preventing the axial movement of the steering column;

a knee protector against which a knee of the driver is strikable under vehicle collision;

means for putting said supporting means into said first condition under application of an impact force over a predetermined level when the driver is restrained by a seat belt and into said second condition even under application of said impact force when the driver is released from the seat belt;

means for applying said impact force to said steering column under said first condition, when the knee of the driver strikes against said knee protector; and

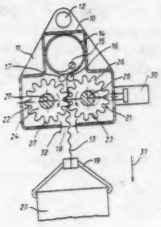
means for absorbing an axial impact force input to the steering column under said second condition of said supporting means.

4,978,139

ENERGY ABSORBING DEVICE FOR SAFETY BELTS OF MOTOR VEHICLES

Rudolf Andres, Sindelfingen; Heinz Knoll; Harald Pfistner, both of Stuttgart, and Voker Petri, Aidlingen, all of Fed. Rep. of Germany, assignors to Mercedes-Benz AG, Fed. Rep. of Germany

Filed Dec. 19, 1989, Ser. No. 452,586
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1988, 3842791
Int. Cl.[5] B60R *22/28*
U.S. Cl. 280—805 7 Claims



1. An energy absorbing damping device for a safety belt of a motor vehicle comprising;

a plastically deformable strip element connected to the safety belt;

a guide bolt for causing a first deflection of the strip element as a result of pulling forces on the safety belt which exceed a certain size; and

deformation members, which are arranged downstream from the guide bolt in a pull-out direction and on both sides of the strip element, for subsequently alternately deforming the strip element on account of deformation forces provided by the deformation member which act on the strip element in succession and in opposite directions;

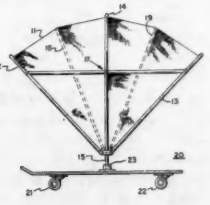
wherein the deformation members are formed as two toothed rollers, which are rotatably mounted on bearing bolts and engage with one another with rounded deformation teeth.

4,978,140

HAND-HELD SKATE SAIL

Roger M. Babson, 258 Pt. Pleasant Ave., Bayville, N.J. 08721

Filed Jun. 5, 1989, Ser. No. 361,598
Int. Cl.[5] A63C *3/00*
U.S. Cl. 280—810 2 Claims



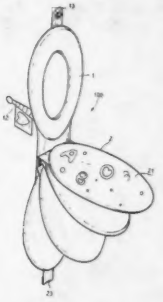
1. In combination, a skateboard having a substantially planar upper surface, a lower surface with wheels attached thereto, and a hand-held sail attached to said upper surface, said sail comprising: a central vertical brace, a pair of identical spars, a lower end of each spar being connected to said central brace at a pivotal connection located adjacent the lower portion of said central brace, said central brace being of substantially the same length as said spars, a horizontal cross brace releasably secured to said central brace, said cross brace having end portions releasably secured to respective ones of said spars at a location above the midpoint of each spar, wherein said spars extend upwardly and outwardly from opposite sides of said central brace and wherein the horizontal distance between the upper end of each said spar and said central brace is substantially equal to the vertical distance between the upper end of each said spar and a horizontal plane intersecting said pivotal connection, a single piece of sail cloth secured to said spars and extending therebetween, said sail cloth having an upper edge configuration which extends to a location proximate the upper ends of each of said central brace and said spars, said sail cloth being tightly drawn between said spars when said cross brace is secured to said central brace and said spars, battens fitted within said sail and extending upwardly and outwardly between said central brace and said spars, and a socket secured to the upper surface of the skateboard for rotatably receiving and supporting the lower portion of said central brace about an axis extending perpendicular to the upper surface of the skateboard.

4,978,141

INFLATABLE INTELLIGENCE ALBUM

Kuang-Ping Wu, Fl. 5, No. 19, Lane 595, Pei An Rd., Taipei, Taiwan

Filed Mar. 21, 1990, Ser. No. 496,780
Int. Cl.[5] B42D *1/00*
U.S. Cl. 281—15.1 1 Claim



1. An inflatable intelligence album comprising:

a plurality of leaves having indicia thereon and being coupled one to the other on one end thereof to define a book-like structure, each of said leaves being defined by a sheet of sponge material completely sealed within a plastic bag; and,

an inflatable ring coupled to said plurality of leaves on one end thereof for overlaying an uppermost one of said plurality of leaves, said inflatable ring being inflated by a check valve formed thereon, whereby said inflatable ring provides floating for use in water of said intelligence album.

4,978,142

MULTIPLE PLY ASSEMBLY

Rudolph T. Kaluza, Aurora, Colo., assignor to National Graphics Company, Denver, Colo.

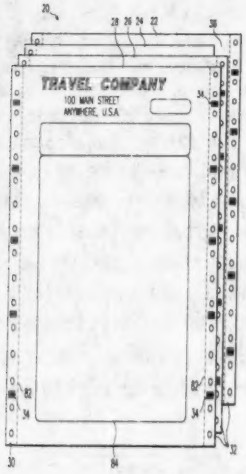
Filed Aug. 11, 1988, Ser. No. 231,776
Int. Cl.[5] B41L *1/26*
U.S. Cl. 282—11.5 A 27 Claims

1. A multiple ply assembly, comprising:

first and second plies, wherein said first and second plies are scored along two parallel lines defining three adjacent one-third panel sections of said first and second plies;

means for connecting said first and second plies to define a

sleeve within one of said panel sections, said sleeve accommodating insertion of material therewithin, wherein said first and second plies are connected along substantially parallel lines; and



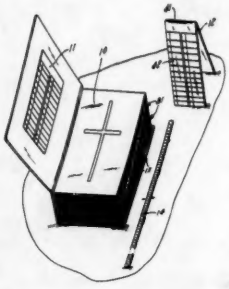
means for restricting movement of said material from said sleeve.

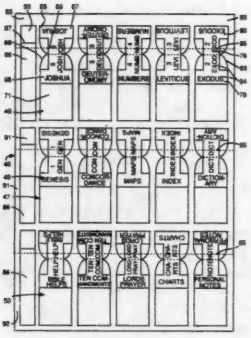
4,978,143

BOOK INDEXING SYSTEM

Thomas H. Ericson, 1733 S. 5th St., Milwaukee, Wis. 53204

Filed Aug. 23, 1989, Ser. No. 397,772
Int. Cl.[5] B42F *21/00*
U.S. Cl. 283—38 **20 Claims**





15. A book indexing kit, comprising:
an index table comprising a sheet having printed thereon a first series comprising words arranged in alphabetical order, which words comprise titles of distinct parts of a predetermined book, and a second series comprising numbers arranged in non-numerical order, one of said numbers being aligned with each word of said first series; and

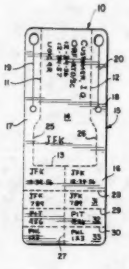
at least one tab dispensing sheet comprising a backing sheet having a release layer of pressure sensitive adhesive releasing material on a face thereof and having a weakened line across the width thereof, and a row of tabs superposed on said backing sheet each comprising a base layer having a layer of pressure sensitive adhesive coated on a bottom face thereof, said adhesive layer being disposed in contact with said release layer of said backing sheet, and indicia defining one of said numbers disposed on a top face thereof, a portion of each of said tabs overlying said weakened line, said kit including a numbered tab for each of said numbers in said second series.

4,978,144

AIRLINE LUGGAGE TAG AND JACKET THEREFOR AND METHOD OF USE

Eric Schmidt, Elgin, and John R. Poplawski, Darien, both of Ill., assignors to Wallace Computer Services, Inc., Hillside, Ill.

Filed Dec. 18, 1989, Ser. No. 451,780
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—70 **14 Claims**



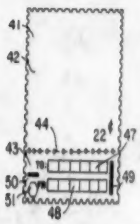
1. A luggage tag comprising an elongated paperboard blank, a pair of spaced apart longitudinally extending lines of perforation extending from one end and spaced apart a distance sufficient to provide a check portion adapted to carry passenger and flight information, a transverse line of perforation connecting said pair of lines of perforation to permit detachment of said check portion from said blank leaving a generally U-shaped portion with the base of said U-shaped portion being adjacent the other end of said blank and the arms of said U-shape flanking said check portion, a longitudinally extending slit in each arm, a centrally longitudinally extending line of weakness in said U-shaped base to permit the development of an L-shaped tag part including an arm and part of said base with the part of said base being installable into said slit to capture the handle of a piece of baggage.

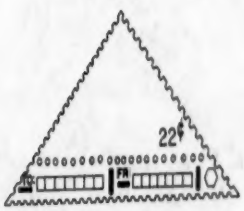
4,978,145

POSTAL STAMP, PROCESS, APPARATUS, AND METERING DEVICE, THEREOF

Ameer G. Mikhail, 2103 Windom Ct., Bel Air, Md. 21014

Division of Ser. No. 90,839, Aug. 28, 1987, Pat. No. 4,876,000.
This application May 1, 1989, Ser. No. 346,233
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—71 3 Claims





1. A postal stamp comprising:

a sheet of thin material having two surfaces, one of said surfaces being coated with an adhesive;

said sheet containing a line of perforations such that said sheet may be separated into at least two pieces;

a first piece of said sheet having first indicia for defining the attributes of said stamp, said indicia being carried on the surface of said piece not coated with said adhesive;

a second piece of said sheet having second indicia defining an area for emplacement of identification indicia identifying both an origination and a destination mailing center, whereby when the identification indicia have been emplaced in said area, the identification indicia can be detected by a scanning device;

said second piece of said sheet further having third indicia comprising at least one distinct marking printed for use as a reference frame to alert a scanning device in determining the location and orientation of the identification indicia; and

said second piece of said sheet having fourth indicia printed thereon which indicia is machine readable and defines the monetary value of the stamp.

4,978,146

METHOD FOR MAKING UNIQUELY ENCODED TRANSACTION CARDS AND RELATED SHEET PRODUCTS

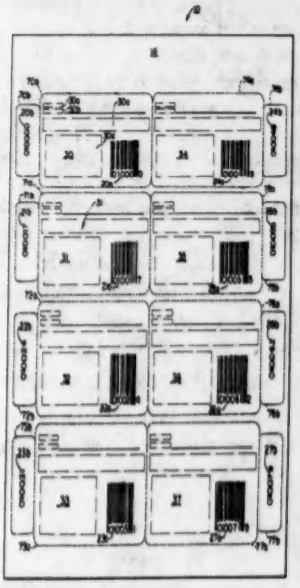
Richard O. Warther, West Chester, and Raymond Steen, Jr., Chester Springs, both of Pa., assignors to The Vanguard Group of Printing Companies, Exton, Pa.

Filed Mar. 30, 1990, Ser. No. 502,005
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—81 18 Claims

18. A printed sheet product comprising:

a thin core formed by a single sheet of material having a pair of opposing major planar sides;

a plurality of sets of code fields printed on a first side of the core, each set of code fields being printed with a numeric code unique to the set, the unique numeric code of each code field set being printed in at least a bar format in at least a first field of each set and in at least a numeral format in at least a second field of each set, the second code field of each set being spaced from the first code field of the set on the first side of the core; and



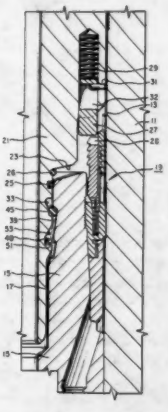
a layer of pressure sensitive adhesive applied to at least part of a second side of the sheet product directly opposite at least part of at least one of the first and second fields of each code set printed on the first side of the core.

4,978,147

ELASTOMERIC LOCKDOWN AND SHEAROUT DEVICE

Herman O. Henderson, Jr., and Mark Q. Henneke, both of Houston, Tex., assignors to Vetco Gray Inc., Houston, Tex.

Filed Apr. 27, 1990, Ser. No. 515,244
Int. Cl.[5] F16L *35/08;* E21B *33/04*
U.S. Cl. 285—2 6 Claims



1. In a well having a tubular inner member adapted to insert within and be pulled from a bore of a tubular outer member, an improved means for retaining the inner and outer members together, comprising in combination:

a retaining groove and a reaction groove;

one of the grooves being formed in the bore of the outer member;

the other of the grooves being formed on the exterior of the inner member, the retaining and reaction grooves being

positioned to locate adjacent each other when the inner member is fully inserted within the outer member;

the retaining groove having a deeper portion joining a shallower portion which is bounded by a shearing side wall;

the reaction groove having a shearing side wall which opposes the shearing side wall of the retaining groove when the inner and outer members are fully inserted together;

a solid elastomeric ring carried within the retaining groove, the ring locating in the deeper portion when the inner and outer members are being pushed together, the ring protruding into the reaction groove when the inner member is fully inserted into the outer member, the shallower portion sliding relative to the ring until the ring locates in the shallower portion and is contacted by the opposed shearing side walls when the inner and outer members are urged apart from each other; and

the protrusion of the ring from the shallower portion into the reaction groove being sufficient to prevent the inner and outer members from being pulled apart from each other unless sufficient pulling force is applied to cause the ring to shear.

4,978,148

COUPLING FOR MULTI-PASSAGE TUBE

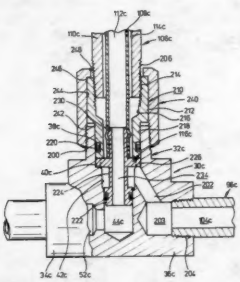
Seiji Kosugi; Norio Ando, and Hisao Sagara, all of Sohka, Japan, assignors to Shoketsu Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 153,569, Feb. 2, 1988, Pat. No. 4,796,924, which is a continuation of Ser. No. 824,235, Jan. 30, 1986, abandoned. This application Aug. 5, 1988, Ser. No. 228,936

Claims priority, application Japan, Aug. 20, 1985, 60-127106; Aug. 26, 1985, 60-130687

Int. Cl.[5] F16L *47/00*

U.S. Cl. 285—133.1 **3 Claims**



1. A coupling for a multi-passage tube having a plurality of fluid passages, comprising a body having an insertion hole for insertion of the multi-passage tube therein and as many fluid passages communicating with said insertion hole as the number of the fluid passages of the multi-passage tube, said multi-passage tube comprising inner and outer tubes defining the fluid passages therein, and engaging means for inserting said inner and outer tubes in said body to provide communication between the fluid passages of the multi-passage tube and the fluid passages of said engaging means including a coupling member having a flanged portion and having a first passage for communicating with one of said inner and outer tubes and a plug member for engaging the other of said inner and outer tubes, an engagement portion of the coupling member engaging said plug member, the arrangement being such that said coupling member is fitted in a hole defined in said body and communicates with one of the fluid passages in said body to provide communication between said one fluid passage of said body and said one tube, and another fluid passage of said body communicating with the other of said inner and outer tubes through a second passage defined in said flanged portion of said coupling member.

4,978,149

HOSE COUPLING

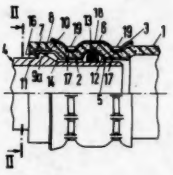
Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,632

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815170

Int. Cl.[5] F16L *33/20*

U.S. Cl. 285—256 **9 Claims**



1. A coupling for establishing a separable connection between end portions of first and second tubular components wherein the end portion of the first component has external retainer means and the end portion of the second component is elastic, particularly between an end portion of a first component in the form of a pipe and an end portion of a hose, comprising a substantially sleeve-like tubular member having a circumferentially complete tubular section and a second section including at least one flexible coupling element separably engageable with the external retainer means of the end portion of the first component, said tubular section and a portion at least of said at least one coupling element being receivable in the elastic end portion of the second component with attendant expansion of the elastic end portion so that the elastic end portion can maintain the at least one coupling element in engagement with the external retainer means.

4,978,150

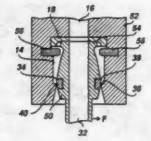
QUICK DISCONNECT FLUID COUPLING

Peter A. Schoot, King County, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 18, 1988, Ser. No. 273,248

Int. Cl.[5] F16L *35/00*

U.S. Cl. 285—304 **16 Claims**



1. A quick disconnect fluid coupling, comprising:

a socket having a generally cylindrical recess with a fluid opening at its distal end;

a plug fitting into the proximal end of the recess of said socket, said plug having a fluid opening at its end communicating with the fluid opening of said socket;

releasable retaining means securing said plug within said socket, said retaining means being engaged and disengaged by axial forces applied between said plug and socket in opposite directions, respectively, said retaining

means allowing said plug to pivot in said socket about said retaining means; and

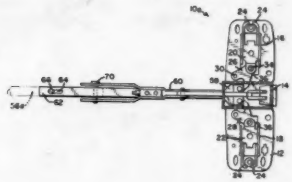
locking means axially spaced from said retaining means, said locking means preventing disengagement of said plug from said socket by preventing axial movement between said plug and socket when said locking means is engaged, said locking means being engaged by pivotal movement of said plug within said socket resulting from transverse forces applied to said plug.

4,978,151

LATCH-OPERATING MECHANISM FOR A PANIC EGRESS DEVICE

Michael D. Coleman, Zionsville, and Kerry W. Stadtfeld, Greenwood, both of Ind., assignors to Von Duprin, Inc., Indianapolis, Ind.

Filed Aug. 17, 1989, Ser. No. 394,886
Int. Cl.[5] E05B *65/10*
U.S. Cl. 292—21 **6 Claims**



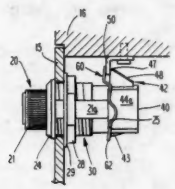
1. A latch-operating mechanism for a panic egress device, comprising: a chassis; a housing coupled to said chassis; a primary latch bolt pivotably coupled to said housing; output shoes for secondary latches, said output shoes being movably engaged with said chassis; and bellcranks pivotably mounted on said chassis; wherein first ends of each of said bellcranks are pivotably coupled to said shoes; and including first linkage means coupled to said primary latch bolt for effecting movement of said bolt relative to said housing; second linkage means coupled to second ends of said bellcranks for effecting movement of said shoes relative to said chassis; said first and second linkage means are slidably engaged with said housing and said chassis, respectively; and including means coupling said linkage means together (a) for coincident movement of both said linkage means, in a first mode of operation of said mechanism, and (b) for independent movement of one of said linkage means with respect to the other of said linkage means, in a second mode of operation of said mechanism.

4,978,152

SLAM-ACTION LATCH WITH EJECTOR SPRING

Robert H. Bisbing, Springfield, Pa., assignor to Southco, Inc., Concordville, Pa.

Filed Aug. 18, 1989, Ser. No. 395,660
Int. Cl.[5] E05C *1/12*
U.S. Cl. 292—169 **15 Claims**



6. A latch for use in securing two closure members together, comprising:

(a) a latch housing adapted for being affixed to a closure member for non-rotational movement relative thereto;

(b) a keeper adapted for being fixedly secured to another closure member;

(c) a pawl housing fixedly connected with said latch housing and forming a longitudinal extension thereof;

(d) a pawl having at least one non-camming surface mounted within said pawl housing for reciprocal movement between extended and retracted positions relative thereto;

(e) latch actuating means connected to said latch housing at a location thereon opposite the connection between said latch housing and said pawl housing, said latch actuating means comprising means for selectively moving said pawl into said retracted position;

(f) biasing means disposed around said pawl housing and adjacent said latch housing and positioned to contact said at least one non-camming surface of said pawl, wherein when said at least one non-camming surface of said pawl is engaged with said keeper, said keeper is disposed between said at least one non-camming surface and said biasing means; and

(g) wherein said biasing means comprises means for

(1) biasing said latch housing away from said keeper; and

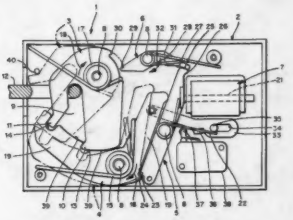
(2) biasing said pawl toward said retracted position to facilitate the engagement of said pawl with said keeper.

4,978,153

LATCH FOR A LABORATORY APPARATUS

Christian Hirsch, Bruchkobel; Dieter Schröder, Osterode; Eckart Kopowski, and Helmut Köcher, both of Braunschweig, all of Fed. Rep. of Germany, assignors to Heraeus Sepatech GmbH, Osterode, Fed. Rep. of Germany

Filed Jun. 29, 1989, Ser. No. 373,944
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1988, 3821840
Int. Cl.[5] E05C *3/24*
U.S. Cl. 292—201 **22 Claims**



1. A latch for a laboratory apparatus, for locking a closing panel to its housing, having

a hook (12) in one of said panel and said housing and

a lock (1) in the other of said panel and said housing, said lock having a pivotable locking element (3) with a claw-shaped opening (9) which engages the hook against the pressure of a spring (17) and which is releasable from engagement with the hook (12) by an actuating element (7),

comprising, in accordance with the invention,

a closing element (4), which engages said locking element (3) under spring force, and

an opening element (5), which engages a portion (21) of said actuating element (7) and acts on closing element (4),

said opening and closing elements being pivotably disposed between said locking element (3) and said actuating element (7), for movement between a locking position and an opening position;

a securing element (6), which engages opening element (5) and locking element (3), pivotably abutting opening ele-

ment (5) under spring tension, disposed between said opening element (5) and said locking element (3),

and wherein pivot axes (8) of locking element (3), closing element (4), opening element (5), and securing element (6) run parallel to one another, wherein opening element (5) has at one end a guide surface (25) for securing element (6), and at the other end a locking nose (23) which in said locking position fits behind a projection (24) on closing element (4),

wherein securing element (6) has a retaining nose (28) in a middle area of a guide surface, into which nose a cam (26) of opening element (5) engages in the opening position,

wherein closing element (4) has a first groove (13) at an end opposite opening element (5) in the locking position, into which groove (13) a first projection (10) of locking element (3), which delimits the claw-shaped opening (9) on one side, engages,

and wherein securing element (6), on a pivot side which is opposite guide surface (27) and retaining nose (28), is releasably pivotable by an actuating cam (30) on locking element (3) in the opening position, releasing retaining nose (28) of securing element (6) out of engagement with opening element (5).

4,978,154

POWER-ACTUATED MOTOR-VEHICLE DOOR LATCH WITH ANTITHEFT FEATURE

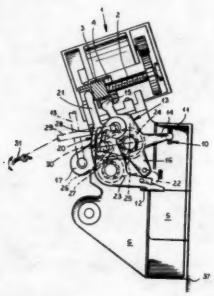
Frank Kleefeldt, Heiligenhaus; Johannes T. Menke, Velbert, and Ulrich Köstler, Unterschleissheim, all of Fed. Rep. of Germany, assignors to Kiekert GmbH & Co. Kommanditgesellschaft, Heiligenhaus and Bayerische Motoren Werke Aktiengesellschaft, Munich, both of, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,834

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1988, 3827610; Feb. 1, 1989, 3902873

Int. Cl.[5] E05C *3/26*

U.S. Cl. 292—201 **4 Claims**



1. A motor-vehicle door latch for use on a vehicle door having inside and outside handles and inside and outside locking elements, the latch comprising;

a first housing part;

a latch fork pivotal on the first part and engageable in a locking position with a door bolt to retain same and lock the door;

a lock pawl pivotal on the first part and engageable in a retaining position with the fork to retain same in the locking position;

an outside operating lever pivoted on the first part and connected to the outside handle;

an unlocking lever on the first part connected to the outside locking element and connected to the lock pawl, whereby operation of the unlocking lever can unlock the door;

a second housing part mounted on the first part;

an inside operating lever pivoted on the second part and connected to the inside handle;

an inside locking lever pivoted on the second part and connected to the inside locking element;

a coupling device pivoted coaxially with the inside locking lever and having one arm connected to the unlocking lever of the first housing part and another arm;

a central actuating unit on the second housing part and including

an actuator,

a spindle,

a nut on the spindle displaceable between an un lock, a lock and an antitheft position, and

a slide displaceable jointly with the nut between the lock and unlock positions and connected to the other arm of the coupling device; and

antitheft coupling means engageable between the nut, the coupling device, and the inside locking lever for coupling the inside locking lever to the coupling device and therethrough to the unlocking lever in the lock and unlock positions of the nut and for decoupling the inside locking lever from the coupling device in the antitheft position of the nut.

4,978,155

ELECTRIC ACTUATOR FOR DOOR LOCK

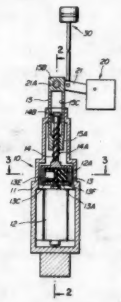
Fumio Kobayashi, Yokohama, Japan, assignor to Ohi Seisakusho Co., Ltd., Yokohama, Japan

Filed Apr. 28, 1989, Ser. No. 344,379

Claims priority, application Japan, May 18, 1988, 63-64454[U]

Int. Cl.[5] E05C *3/26, 17/56*

U.S. Cl. 292—336.3 **12 Claims**



7. A door lock system comprising:

a door lock proper having an operation lever pivotally connected thereto;

a locking knob pivotally connected to said operation lever;

an electric motor having a drive shaft;

an output shaft arranged coaxial with said drive shaft, said output shaft having a helical ridge formed thereabout;

a clutch means interposed between said drive shaft and said output shaft for permitting a power transmission only from said drive shaft to said output shaft; and

an operation rod having a threaded bore operatively engaged with the helical ridge of the output shaft, said operation rod having a portion to which said operation lever of said door lock proper is pivotally connected.

4,978,156

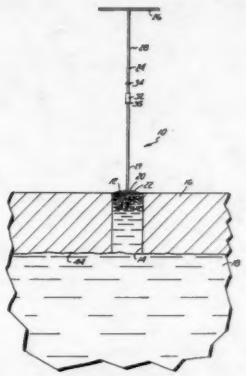
ICE CHIP CLEARING TOOL

Adolph V. Marhula, Rte. 1, Box 61D, Baudette, Minn. 56623

Filed Jun. 13, 1989, Ser. No. 365,309

Int. Cl.[5] A01K *97/00*

U.S. Cl. 294—1.1 **9 Claims**



1. For clearing ice chips resulting from the boring of a cylindrical hole through ice covering a body of water preparatory to fishing through the ice, an ice chip clearing tool including:

(a) a downwardly concave circular plate of substantially the same diameter as the bored hole, the plate being provided with a plurality of openings therethrough, the openings being of size and configuration to prevent ice chips of appreciable size from passing through the plate while allowing water to pass therethrough;

(b) a handle;

(c) a rigid shaft extending downwardly from the handle and upwardly from the plate at right angles to the plane of the circumference of the plate, said shaft being of length to extend the plate at least a substantial distance below the bottom surface of the ice while the handle remains above the top surface of the ice.

4,978,157

REAR SEAT BACK MOUNTING STRUCTURE FOR AUTOMOTIVE VEHICLE

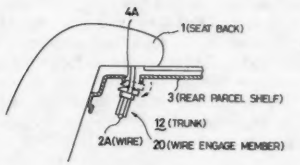
Takashi Murakami, Ebina, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 12, 1989, Ser. No. 351,113

Claims priority, application Japan, May 13, 1988, 63-63097[U]

Int. Cl.[5] B60N *2/22*

U.S. Cl. 296—63 **8 Claims**



1. A rear seat back mounting structure for an automotive vehicle, for mounting a rear seat back on a rear parcel shelf for partitioning a trunk room from a passenger compartment, comprising:

(a) a U-shaped wire attached to an upper reverse surface of the rear seat back and inserted into the trunk room through a hole formed in the rear parcel shelf; and

(b) a selectively engageable wire engaging member selectively engageable and disengageable with an end of said U-shaped wire only from the trunk room, said wire engaging member comprising a solid portion suspended below said shelf by said wire and having a dimension larger than a diameter of the hole formed in the rear parcel shelf for precluding passage of said engaging member through the hole when said wire engaging member is engaged.

4,978,158

VEHICLE SEAT

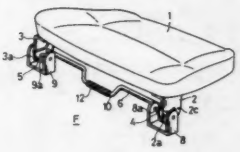
Yoshiaki Kubo, and Sinichi Toya, both of Akishima, Japan, assignors to Tachi-S Co., Ltd., Akishma, Japan

Filed Oct. 24, 1989, Ser. No. 426,107

Claims priority, application Japan, Sep. 26, 1988, 63-125266[U]

Int. Cl.[5] B60N *1/02*

U.S. Cl. 296—65.1 **4 Claims**



1. A vehicle seat comprising:

a pair of base brackets fixed on the floor of the vehicle,

a pair of support brackets fixed to opposite sides of a cushion,

a pair or lock members,

a transversely extending connecting rod rotatably journaled to the support brackets and fixedly connected at its end portions to the respective lock members, said connecting rod including a crank-like handle portion formed at an intermediate portion of the connecting rod and operable to disengage the lock members from the base brackets.

4,978,159

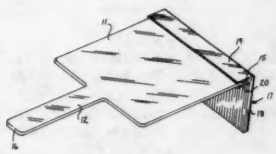
AUTOMOTIVE GLARE SHIELD

Bette W. Landford, 16967 Joshua St., Hesperia, Calif. 92345

Filed Dec. 29, 1989, Ser. No. 459,203

Int. Cl.[5] B60J *3/00*

U.S. Cl. 296—97.6 **3 Claims**



1. An automotive glare shield kit apparatus for selective positioning within an automobile interior, the interior including a windshield and a visor member mounted overlying the windshield, the apparatus comprising,

a planar shield including a rectangular upper member and elongate handle member orthogonally and integrally formed to a lower edge of the upper member, the upper member including a top edge defined by a first length, the handle terminating remotely from the upper member and

a bottom edge oriented parallel to the top edge, the bottom edge defined by a second length, the planar shield formed of a photo-chromatic polymeric material to darken in response to available light, and

including a first hanger means securable to the top edge, the hanger means including an "L" shaped member formed with a first leg oriented orthogonally relative to the shield and a second leg orthogonally oriented relative to the first leg, the second leg including an elongate "U" shaped resilient groove to receive the top edge therewithin, the second leg defined by a second length equal to the first length to secure the second leg coextensively to the top edge.

4,978,160

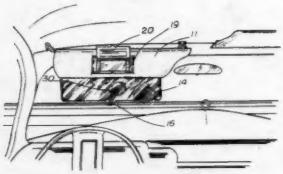
AUTOMOBILE SUN SHIELD

Heinz Welschoff, 1470 NE. 60th St., Fort Lauderdale, Fla. 33334

Continuation-in-part of Ser. No. 805,982, Dec. 5, 1985. This application Apr. 15, 1986, Ser. No. 852,126

Int. Cl.[5] B60J *3/02*

U.S. Cl. 296—97.8 **4 Claims**



1. A sun visor for an automobile adapted to be hingedly mounted and comprising a body portion pivotable into a down or up position and including a translucent sun screen normally stored within the visor but readily extendable down through the bottom edge of the visor to a selected position at which it will remain; said body portion being a one-piece construction including a longitudinal flexible hinge portion (**11***c*), a top portion (**11***a*) and a bottom portion (**11***b*) having rows of teeth (**13***a*) on the side edges of the bottom portion; bottom portion (**11***b*) having rows of teeth (**13***a*); said top and bottom portions being connected to opposite sides of said hinge portion; said top and bottom portions being folded together and sealed to form the body portion; said sun screen having side edge indentions (**15**) cooperable with said teeth (**13***a*) and (**13***b*) when said translucent sun screen is positioned between said top and bottom portions (**11***a*) and (**11***b*); said sun visor being further characterized in that said screen has been positioned between said top and bottom portions before they are folded together and sealed.

4,978,161

APPARATUS AND METHOD FOR APPLYING A TARGA-LIKE BAND TO A CONVERTIBLE TOP VEHICLE

Todd M. Schulze, P.O. Box 540924, Orlando, Fla. 32854-0924

Filed Apr. 6, 1989, Ser. No. 334,698

Int. Cl.[5] B60R *27/00*

U.S. Cl. 296—180.1 **18 Claims**

1. A readily removable attachment for applying to a vehicle in place of a conventional convertible top, said vehicle comprising:

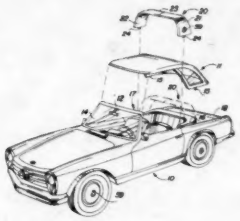
a body including a passenger compartment having a rear, openings located on upper surfaces of said body peripherally on opposite sides of said rear, and elements located on said body and accessible through said openings for releasably lockingly engaging complementary protruding elements of said convertible top thereto; and

said attachment comprising:

an inverted U-shaped band member having opposite upwardly directed pillar portions with upper and lower ends, and a laterally extending central bar portion interconnecting said upper ends; and

means, including elements protruding from said lower ends, for releasably lockingly engaging in complementary fashion with said body located elements;

said band member having an airfoil cross-sectional configuration; and



said attachment being dimensioned, configured and adapted so that when said attachment is brought into position over said rear of said passenger compartment in place of said top, said elements protruding from said lower ends can be brought through said openings and locked to said body located elements to establish a releasable rigid connection between said band member and said body to impart a Targa-like, integral roll bar appearance to said vehicle.

4,978,162

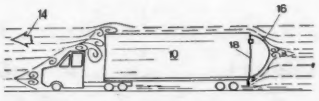
DRAG REDUCER FOR REAR END OF VEHICLE

Francois P. Labbé, 4531, St-Joseph, Apt. 6, Drummondville, Quebec J2B 1A1, Canada

Filed Nov. 29, 1989, Ser. No. 442,894

Int. Cl.[5] B62D *35/00*

U.S. Cl. 296—180.2 **7 Claims**



1. A drag reducer adapted to be mounted behind a vehicle having a substantially flat rear face and lateral faces substantially perpendicular to said rear face, said reducer comprising a large piece of flexible material substantially air-tightly fixed along the periphery of said rear face adjacent said lateral faces, said piece of material being substantially air-tight and having an area larger than said rear face and adapted to display a convex surface when fully extended, said material being provided with a single opening located adjacent the periphery of said rear face, an air inlet tubular member having one end connected to said opening, the other end of said member adapted to project forwardly on one of the lateral faces of said vehicle,

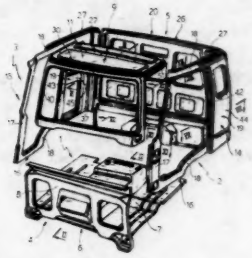
whereby, upon a forward movement of the vehicle, air is introduced in said air inlet tubular member and projected between said rear face and the piece of material to inflate the latter by gradually building air pressure inside said drag reducer forming a plano-convex air bag, the projection of air in said bag being substantially terminated when said plano-convex surface is fully extended.

4,978,163

CAB STRUCTURE FOR A HEAVY MOTOR VEHICLE

Piero Savio, Borgaretto, Italy, assignor to Iveco Fiat S.p.A., Italy

Filed Nov. 16, 1989, Ser. No. 437,748
Claims priority, application Italy, Nov. 18, 1988, 68030 A/88
Int. Cl.[5] B62D 23/00
U.S. Cl. 296—190 10 Claims



1. A cab structure for a heavy motor vehicle of the type in which the cab is disposed in a forward position on the frame, said structure comprising substantially a floor (1), two sides (2, 3), a front (4) and a rear wall (5), characterized by comprising:

a first structural element (6) provided with a first wall (7) forming said floor and a second wall (8) substantially orthogonal to the preceding and forming the lower part of said front;

a second structural element (9) provided with a rectangular frame (10) forming the upper part of said front, and a wall (11) substantially orthogonal to said frame and forming the front part of the cab roof;

a third and fourth structural element (14, 15) each of which comprises a frame (16) provided with a pair of uprights (17) and a pair of longitudinal members and defining a closed surround for a door, and a side panel (19) fixed to said frame, said side panel further comprised of an upright (23) which is fixed to the rear vertical edge (24) of the side panel (19), each said frame with said side panel forming one of the sides;

a fifth structural element (20) in the form of a substantially flat panel for forming said rear wall.

4,978,164

MODULAR VEHICLE BODY STRUCTURE

Katsumi Nakamura, Fujisawa; Kenichi Miyazaki, Sagamiha; Taro Hagiwara, Sagamihara, and Hiroshi Kuriyama, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Mar. 25, 1988, Ser. No. 173,460
Claims priority, application Japan, Mar. 26, 1987, 62-70485; Apr. 22, 1987, 62-60958
Int. Cl.[5] B62D 25/00
U.S. Cl. 296—197 4 Claims

1. A vehicle body structure comprising:

an engine compartment assembly having a cowl box and a dash lower panel;

a floor assembly having a front floor panel and a rear floor panel;

at least one body side assembly having a front pillar, a rear pillar, a roof side rail and a side sill;

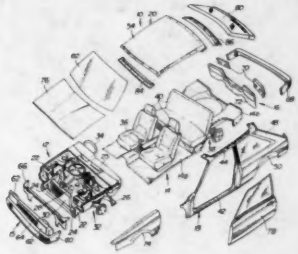
a roof assembly having a roof panel;

said engine compartment assembly, floor assembly, body side assembly and roof assembly constituting independent vehicle body sections which are prepared and painted independently;

said engine compartment assembly, floor assembly, body side assembly and roof assembly having joining portions which overlap each other;

means for joining said joining portions together with bolts, nuts, and a first sealant adhesive;

said first sealant adhesive being applied in place on one of said joining portions prior to joining of said joining portions; and



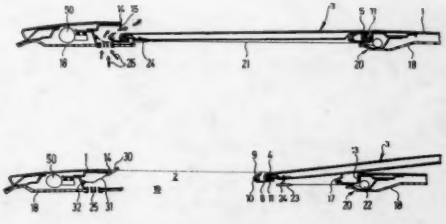
means for holding said first sealant adhesive in place on said one joining portion prior to joining of said joining portions, wherein said holding means comprises a second sealant adhesive which surrounds said first sealant adhesive and which is higher in viscosity than said first sealant adhesive and which is applied to said one joining portion to hold said first sealant adhesive.

4,978,165

MOTOR VEHICLE ROOF WITH A ROOF OPENING THAT CAN BE CLOSED BY A COVER

Thomas Schreiter, Munich; Arpad Fuerst, Germering, and Bernhard Wingen, Feldkirchen, all of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Fed. Rep. of Germany

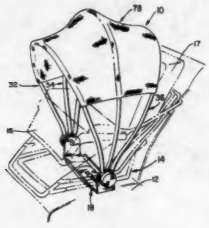
Filed Jan. 3, 1990, Ser. No. 460,544
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1989, 3903035
Int. Cl.[5] B60J 7/047
U.S. Cl. 296—216 33 Claims



1. In a motor vehicle roof of the type having a roof opening in a fixed roof skin, a cover by which said opening can be closed and at least partially opened, and a cover displacement means for pivoting of the cover around a pivot axis lying in proximity to its front edge, so as to raise a rear edge of the cover above the fixed roof skin into a raised ventilation position and for, selectively, pushing the cover rearward over the fixed roof skin, once raised in a slid-back position; the improvement wherein said cover displacement means further comprises means for also pivoting the cover generally around a

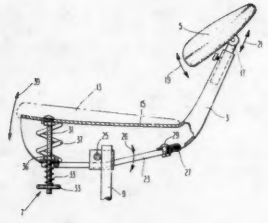
rear edge of the cover into a lowered ventilation position in which the front edge of the cover is lowered below the fixed roof skin.

4,978,166
SUNSHADE FOR CHILD CAR SEATS
Francis C. James, 304 Harker Rd., Fort Oglethorpe, Ga. 30742
Filed Jan. 3, 1990, Ser. No. 460,420
Int. Cl.[5] A47C *7/62*
U.S. Cl. 297—184 **14 Claims**



1. A sunshade assembly comprising a base having first and second members, each of said members having an elongated leg adapted to be disposed beneath a child car seat and an end portion extending upwardly from said leg member adapted to be disposed beyond the sides of said seat, a first of said legs being positioned upon the second of said legs and movable relatively thereto to change the spacing between the end portions, adjustable means for interconnecting said legs together at selective positions corresponding to desired spacings between said end portions, a plurality of substantially U-shape ribs, journal means for pivotably mounting the distal ends of each rib to a respective one of said end portions for permitting said ribs to pivot relative to said first and second members, and a canopy fastened to a central portion of each rib for providing a covering adapted to be superposed over a child car seat.

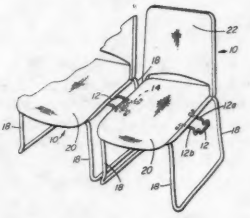
4,978,167
BICYCLE SADDLE WITH BODY SUPPORT
Henry R. Harvey, Box 207, Lahaska, Pa. 18931
Filed Nov. 20, 1989, Ser. No. 439,109
Int. Cl.[5] B60N *2/38*
U.S. Cl. 297—195 **11 Claims**



1. A saddle structure for a bicycle, the bicycle having a frame, the bicycle having front and back ends, the saddle structure comprising a saddle, the saddle including a saddle shell and a cushion connected to the shell, the saddle shell being integrally formed with a support member, the support member extending upwardly and towards the front end of the bicycle, the support member being connected to a cushioned member, the cushioned member being positioned to support the chest of a rider, the saddle shell and the frame being connected at a pivot point, the saddle shell and frame also being connected by resilient means, the resilient means being spaced apart from the pivot point, wherein the saddle shell and support member can rotate together about the pivot point, the structure further comprising means for controlling the amount by which the saddle shell and support member can rotate,

wherein the controlling means comprises a bolt extending through the saddle shell and through the frame, the bolt having a stop nut and a thumb wheel, wherein the distance between the stop nut and thumb wheel determines the amount by which the saddle shell and support member can rotate.

4,978,168
CHAIR HAVING RETRACTABLE GANGING APPARATUS AND COOPERATING STACKING PAD
Giancarlo Piretti, Piazza Trento e Trieste, 2/2 Bologna, Italy
Filed Apr. 9, 1990, Ser. No. 506,170
Claims priority, application Canada, Sep. 25, 1989, 612998
Int. Cl.[5] A47C *15/00*
U.S. Cl. 297—248 **13 Claims**



5. A chair comprising:

A. a seat, having an underside;

B. ganging apparatus, including:

(1) a first ganging member connected to said seat underside near one lateral side thereof, swingable between a retracted position beneath said chair, and an extended position extended out from under said chair;

(2) a second ganging member connected to said seat underside near the opposite lateral side thereof swingable between a retracted position beneath said chair, and an extended position extended out from under said chair;

(3) both of said ganging members being wire-like members formed in a generally U-shape, each with a pair of leg portions joined at one end by a cross portion;

(4) each of said ganging members being provided with interlink means in the vicinity of said cross portion whereby said chairs may be interlinked with an adjacent chair in ganged relation, with said legs of both of said U-shapes extending between the chairs;

C. legs for providing support to said seat; and

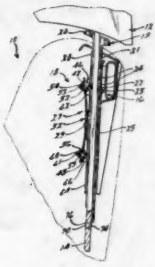
D. a stacking pad attached to said seat underside, the bottom surface of which conforms closely to the top surface of said seat, said pad including means for accommodating the attachment of a frame, to which said legs and ganging members are attached, and including recesses for accommodating said ganging members when in said retracted position.

4,978,169
SEAT HEADREST COMPOSITE SPRING CLIP
Michael V. Shannon, Allen Park, and Peter Y. S. Wong, Ann Arbor, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Dec. 18, 1989, Ser. No. 452,033
Int. Cl.[5] A47C *7/36*
U.S. Cl. 297—410 **2 Claims**

1. In a vehicle seat inc a seat back having an opening, a

headrest assembly having a rectangular sectioned support bar extending downwardly therefrom, a mounting bracket supported on the seat back having a rectangular sectioned vertically disposed passage defined by transversely extending side walls and longitudinally extending end walls, said passage slidably receiving said support bar, an escutcheon having an elongated C-shaped body surrounding the support bar and defining the opening in the seat back, said mounting bracket passage having a resilient leaf spring locking member secured to said bracket one side wall, said leaf spring locking member formed with upper and lower catch means, an -upper window in said bracket one side wall into which said upper catch means extends for spring biased engagement of said bar, a lower window in said bracket one side wall through which said lower latch means extends for spring biased engagement of said bar, and said support bar having at least one recess therein into which said lower catch means is received, an improved composite leaf spring latching member comprising:

a composite sheet metal leaf spring incorporating plastic catch members, said leaf spring having forward and aft planar surfaces, said leaf spring formed with upper and lower transversely extending U-shaped channels projecting forwardly therefrom, each of said upper and lower channel being of generally symmetrical configuration with each channel defined by a pair of planar flank portions joined by a planar bight portion therebetween;



each said upper and lower channel bight portion lying in a common plane oriented parallel to the plane of said leaf spring;

upper and lower plastic members molded from elastomeric resin material secured in said upper and lower channels, respectively, each said plastic member formed with a wedge-shaped catch portion and a block-shaped tenon portion, each said block-shaped tenon portion sized for complementary molded interlocked reception in its associated U-shaped channel such that its associated wedge-shaped portion extends rearwardly therefrom;

one or more retaining through holes located on the a forward surface of its associated bight portion, each said retaining through hole integrally joined with its associated plastic member tenon portion via one or more integral core portions formed in its associated bight portion retaining hole;

whereby with an intermediate portion of said leaf spring fixedly secured to said bracket front wall each said upper and lower plastic member wedge-shaped catch portion operative to be slidably received in an associated upper and lower window for spring biased engagement with said support bar forward face thereby limits the vertical adjusting movement of said headrest.

4,978,170

SEAT WITH ADJUSTABLE BACK AND ARM RESTS

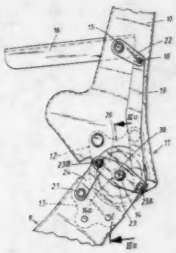
Herbert Pelz, Remscheid; Bernd Klüting, Radevormwald; Heinz-Jürgen Wagener, Remscheid, and Hans-Joachim Berghof, Remscheid-Hasten, all of Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Kg, Remscheid, Fed. Rep. of Germany

Filed Apr. 25, 1989, Ser. No. 343,488

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3814758

Int. Cl.[5] A47C 7/54

U.S. Cl. 297—411 **17 Claims**



1. A seat, particularly for use in motor vehicles, comprising a body supporting first component; a second component including a back rest; at least one hinge including a pintle connecting said second component to said first component for pivotal movement about a substantially horizontal first axis, and means for moving one of said components transversely of said first axis in response to pivoting of said second component about said first axis, said moving means including at least one eccentric on said pintle; at least one arm rest; and means for articulately connecting said arm rest to said components so that the orientation of said arm rest remains at least substantially unchanged when said second component is pivoted about said axis, said connecting means comprising first pivot means connecting said arm rest to said second component for pivotal movement about a second axis, a linkage, second pivot means connecting said linkage to said back rest for pivotal movement about a third axis, and third pivot means connecting said linkage to said first component for pivotal movement about a fourth axis, said second and third and fourth axes being at least substantially parallel to said first axis.

4,978,171

ARM REST DEVICE FOR USE WITH VEHICULAR SEAT

Tomoyoshi Tateyama, Ayase, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Nov. 13, 1989, Ser. No. 434,282

Claims priority, application Japan, Feb. 27, 1989, 1-21577[U]

Int. Cl.[5] A47C 7/54

U.S. Cl. 297—417 **9 Claims**

1. An arm rest device comprising:

a shaft secured to a fixed member;

an arm rest proper having one end portion pivotally disposed about said shaft, said arm rest proper being pivotal between first and second angular positions;

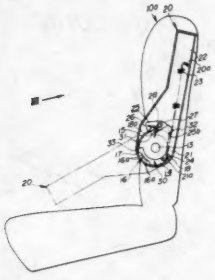
a generally circular plate concentrically secured to said shaft, said circular plate including a larger diameter sectoral portion and a toothed portion;

a blocking plate pivotally disposed about said shaft, said blocking plate including a larger diameter sectoral portion and a radial extension, said radial extension having a flange and a notch;

a latch member pivotally connected at a generally middle portion thereof to said arm rest proper, said latch member

having at its one end a pawl which can form a latching engagement with said toothed portion of said circular plate, and having at the other end a pointed portion which is engageable with said flange and said notch of said blocking plate;

first stopper means, connected to said arm rest proper, for stopping said arm rest proper at said first and second angular positions;



second stopper means, cooperating with said blocking plate, for stopping rotation of said blocking plate relative to said shaft when said blocking plate rotates by a given degree in a given direction to disengage said flange from said pointed portion; and

biasing means, connected to said latch member and said blocking plate, for biasing said latch member in a direction to achieve the latching engagement between said pawl and said toothed portion and for biasing said blocking plate in said given direction.

4,978,172

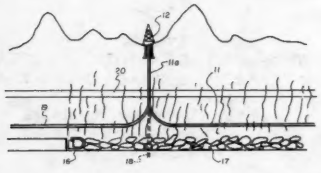
GOB METHANE DRAINAGE SYSTEM

Jeffrey J. Schwoebel, South Jordan, and Terry L. Logan, Park City, both of Utah, assignors to Resource Enterprises, Inc., Salt Lake City, Utah

Filed Oct. 26, 1989, Ser. No. 426,848

Int. Cl.[5] E21B *43/00*; E21C *41/18*

U.S. Cl. 299—12 **6 Claims**



1. A gob methane drainage process comprising, from a surface location that is above and intermediate to the longitudinal axis of a coal seam to be mined or has been previously mined, drilling from a single platform at least one vertical degas hole to above said coal seam to be mined or has been previously mined and curving drilling oppositely from said vertical degas hole into a plurality of degas holes that each extend above, essentially parallel, near parallel or slanted to, and are spaced appropriately apart from the area of the coal seam to be mined or has been previously mined; and removing methane gas through the degas holes to the surface as is produced during and after mining of the coal seam area that is below or adjacent to each said degas hole.

4,978,173

HOLDER FOR CUTTER IN MINING MACHINE

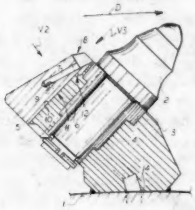
Roland Rothkegel, Voerde, Fed. Rep. of Germany, assignor to Paurat GmbH, Voerde, Fed. Rep. of Germany

Filed Apr. 5, 1990, Ser. No. 505,672

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1989, 3911893

Int. Cl.[5] E21C *35/22*

U.S. Cl. 299—81 **5 Claims**



1. A tooth holder for a cutter of a mining machine, the holder comprising:

a holder body fixed to the cutter and normally displaced thereby in a predetermined longitudinal direction, the body being formed with

a longitudinally generally forwardly open bore,

an outer transversely directed seat face adjacent the bore, and

a feed passage opening at the outer seat;

a sleeve received in the bore;

a cutter tooth in the sleeve;

a nozzle body formed with

a nozzle passage having one end communicating with the feed passage at the seat and an opposite end forming a longitudinally generally forwardly open spray mouth, and

a face complementary fitted to the outer seat face;

means for supplying a fluid under pressure to the feed passage, whereby the fluid exits the spray mouth; and

means for releasably securing the nozzle body to the holder body With the faces engaged tightly together.

4,978,174

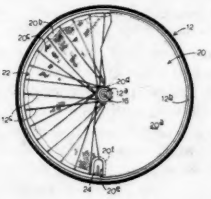
LOW-WEIGHT, LOW-AERODYNAMIC-DRAG DISK WHEEL COVER

John C. Nosler, 2587 Floral Hill Dr., Eugene, Oreg. 97403

Filed Sep. 29, 1989, Ser. No. 416,272

Int. Cl.[5] B60B *7/02*

U.S. Cl. 301—37 R **8 Claims**



1. A low-aerodynamic-drag disk wheel for a vehicle such as a bicycle comprising

a central hub having a rotation axis,

an outer tire-carrying rim concentric with, and spaced radially from, said hub, and

aerodynamic drag-reducing structure interposed said hub

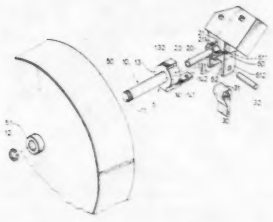
and rim including, on each axial side of said wheel, a smooth-surfaced, smoothly stretched, thin, light-weight plastic film spanning the annular space between said hub and rim and bonded to the latter, said films forming the broad-expanse, opposite, outer, axial sides of the wheel.

4,978,175

DEVICE FOR COUPLING A WHEEL TO A GOLF CLUB CARRIER

Jiin-Chang Wu, Taipei, Taiwan, assignor to Masters Cy Industrial Co., Ltd., Taipei Hsien, Taiwan

Filed Nov. 22, 1989, Ser. No. 440,654
Int. Cl.[5] B60B *35/02, 37/10*
U.S. Cl. 301—121 **3 Claims**



1. A device for coupling a wheel to a leg of a golf club carrier comprising:

a sleeve member axially and rotatably passed through an axle of said wheel, said sleeve member having an annular groove formed at a first end thereof, to which a retaining member is clamped, and a head portion formed at a second end thereof so that said wheel can be prevented from separating from said sleeve member, said head portion of said sleeve member having a tongue extending axially and outwardly therefrom and a central axial bore having a plurality of radial grooves outwardly extend therefrom;

two lugs parallelly extending from a free end of said leg of said golf club carrier;

a fixing rod, which is generally perpendicular to said lugs, having a first end connected to said leg of said golf club carrier, near said free end of said leg, and a second end passing through said central axial bore of said head portion of said sleeve member into said sleeve member so that said tongue of said sleeve member can be extended between said lugs so as to be adjacent to said free end of said leg of said golf club carrier, said fixing rod having a plurality of radial ribs extending therefrom near said first end thereof which are correspondingly fitted into said radial grooves of said sleeve member so as to prevent a rotation thereof relative to said sleeve member when said fixing rod is received in said sleeve member; and

a lever having a clamping head pivoted between said two lugs so that said tongue of said sleeve member can be clamped between said free end of said leg of said golf club carrier and said clamping head of said lever when said lever is depressed toward said free end of said leg of said golf club carrier.

4,978,176

SPOKED WHEEL

Bruce N. Smith, P.O. Box 197, New Castle, N.H. 03854

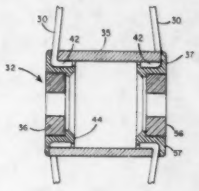
Filed Jun. 22, 1989, Ser. No. 370,023
Int. Cl.[5] B60B *1/04*
U.S. Cl. 301—104 **5 Claims**

1. A wheel comprising:

a. a hug cylinder having first and second open ends;

b. a rim having a plurality of holes for receiving spokes;

c. first and second hub inserts mating with said first and second open ends, said hub inserts being made of a low friction plastic with central apertures designed to serve as axle bearings, each insert having a cylindrical portion that fits inside said cylinder with insufficient space between said cylindrical portion and said hub cylinder for said spokeheads, whereby when said hub inserts are forced into said hub cylinder with said spokeheads in places, a compressive fit is made securing said spokes and said inserts in said hub cylinder; and,



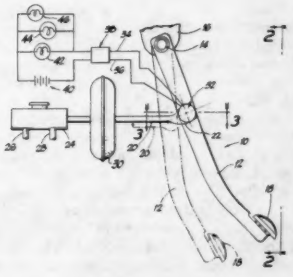
d. a plurality of spokes each having first and second spokeheads, at least one spokehead of each spoke consisting of a substantially right angle bend, the first spokehead of each spoke engaged in a respective one of said holes and the second spokehead of each spoke secured to said hub by compressive engagement of one of said hub inserts into one of said open ends securing said second end between said insert and said hub cylinder.

4,978,177

SIGNAL MECHANISM RESPONSIVE TO FORCE APPLIED TO VEHICULAR BRAKE PEDAL AND THE LIKE

Ronald D. Ingraham, and Peter H. Strom, both of Reed City, Mich., assignors to Nartron Corporation, Reed City, Mich.

Filed Jul. 6, 1989, Ser. No. 376,642
Int. Cl.[5] B60T *13/70*
U.S. Cl. 303—3 **34 Claims**



1. An arrangement effective for creating an output signal, comprising a first movable element, a second movable element, said first movable element being effective for moving said second movable element, signal generating means for indicating when a preselected magnitude of a first force is applied to said first movable element when said first movable element is in the process of at least tending to move said second movable element, said signal generating means comprising force sensitive electrical resistance means, wherein said force sensitive electrical resistance means varies its electrical resistance in response to the magnitude of a force applied thereto, wherein said force sensitive electrical resistance means is situated as to experience thereagainst a reaction-force developed in response to said first force being applied to said first movable element, said force sensitive electrical resistance means being effective

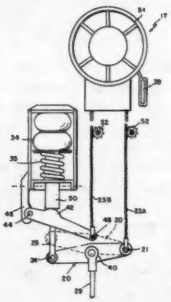
upon said reaction-force attaining a preselected magnitude to produce a magnitude of electrical resistance serving as an output signal indicative of the attainment of said preselected magnitude by said first force applied to said first movable element, wherein said first movable element is pivotally connected to said second movable element by interconnecting pivot means, and wherein said interconnecting pivot means comprises said force sensitive electrical resistance means.

4,978,178

AUTOMATIC SELF-RESETTING PARKING BRAKE

Thomas H. Engle, Stamford, Conn., assignor to General Signal Corporation, Stamford, Conn.

Filed Jun. 9, 1989, Ser. No. 363,918
Int. Cl.[5] F16D *65/14*
U.S. Cl. 303—13 **14 Claims**



1. A parking brake system for a railway vehicle having at least a fluid pipe and a brake actuator for actuating a brake rigging comprising:

output lever means having first, second and third pivot points;

brake means for pivotally connecting a brake actuator to said output lever at said first pivot point;

manual actuator means, including a manually releasable ratchet mechanism and a chain having a first end pivotally connected to said output lever at said third pivot point, for releasing said third pivot point to pivot said output lever means to move said first pivot point to a brake release position; and

automatic actuator means pivotally connected to said output lever means at said second pivot point and connect to said second end of said chain for pivoting said output lever to move said first pivot point to a brake release position and reseting, after a manual release, said manual actuator means by pulling said second end of said chain in response to a release fluid pipe pressure and for pivoting said output lever to move said first pivot point to a brake application position in response to an application fluid pipe pressure.

4,978,179

BRAKE ASSURANCE CIRCUIT OPERATIVE IN RESPONSE TO A LOW BRAKE PIPE PRESSURE

Richard F. Balukin, Pittsburgh, Pa., assignor to American Standard Inc., Wilmerding, Pa.

Filed May 22, 1989, Ser. No. 355,267
Int. Cl.[5] B60T *11/34*
U.S. Cl. 303—33 **14 Claims**

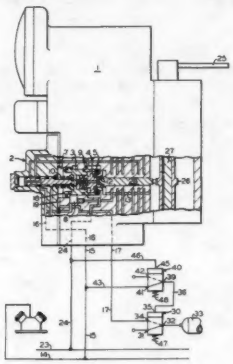
1. A brake assuring circuit for automatically initiating a brake application on a railway train when the fluid pressure carried in the train brake pipe is below a predetermined safe operating value comprising:

(a) a source of fluid having at least a certain chosen pressure;

(b) a safety control pipe normally charged with fluid under pressure from said source;

(c) vent valve means for interrupting the exhaust of fluid under pressure from said brake pipe only in the absence of a reduction of fluid pressure in said safety control pipe;

(d) a volume reservoir; and



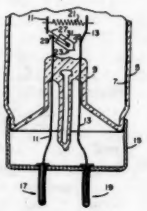
(e) valve means for connecting said safety control pipe to said volume reservoir to effect a reduction of fluid pressure in said safety control pipe when said brake pipe fluid pressure drops below a value corresponding to said predetermined safe operating value.

4,978,180

TRI-MODEL TYPE CIRCUIT BREAKER AND RAPID-START FLUORESCENT LAMP CONTAINING SAME

Andre C. Bouchard, Peabody, and Carlo S. Bessone, Bedford, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Sep. 11, 1989, Ser. No. 406,206
Int. Cl.[5] H01J *7/44*; H05B *41/18*
U.S. Cl. 315—73 **9 Claims**



1. A tri-model circuit breaker for use in a rapid-start fluorescent lamp comprising:

a glass bulb;

first and second electrical conductors sealed into and passing through said bulb; and

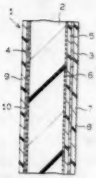
a bimetallic element disposed within said bulb and having first and second end portions, said first end portion of said bimetallic element being affixed to said first electrical lead, said second end portion of said bimetallic element being formed to be spaced from said second electrical lead at a first elevated temperature and in contact with said second electrical lead at ambient temperature and at a second elevated temperature higher than said first elevated temperature, said thermal switch having contact points at

ambient and said second elevated temperature at the same location within said switch.

4,978,181
SUNSHADE

Minoru Inanuma, Hachioji; Shumpei Ohara, Tokyo; Yukio Sano, Shiki; Akihiro Goto, Urawa; Shinji Sasamoto, Narashino; Eiji Kaneko, Tokyo; Takashi Miyao, Sayama; Yukio Torii, Ichikawa; Keijiro Umemoto, Chiba; Ryo Hirako, Hachioji; Nobuo Suzuki, Akishima, and Tadashi Shingu, Hachioji, all of Japan, assignors to Kajima Corp.; Tachikawa Corp. and Teijin Chemicals Ltd., all of, Japan

Filed Jun. 24, 1988, Ser. No. 210,879
Claims priority, application Japan, Jul. 10, 1987, 62-106782[U]
Int. Cl.[5] G02B *5/26, 5/28*
U.S. Cl. 350—1.7 **19 Claims**



1. A sunshade for controlling the amount of sun light shining into a room, the sunshade comprising:

a transparent substrate for transmitting sun light into the room,

an infrared ray-reflecting layer provided on said substrate for reflecting infrared rays passing through the sunshade,

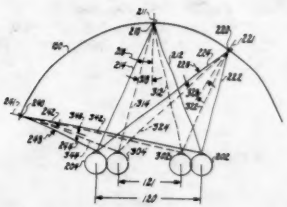
a sun light-reflecting layer provided on said substrate for reflecting a portion of radiant sun light energy passing through the sunshade while partially transmitting visible rays passing through the sunshade, and

light diffusing means for diffusing light reflected by said infrared ray-reflecting layer and sun light-reflecting layer.

4,978,182
LASER PROTECTION VISOR WITH ELLIPSOIDAL GEOMETRY

James M. Tedesco, Livonia, Mich., assignor to Kaiser Optical Systems, Ann Arbor, Mich.

Filed Oct. 23, 1989, Ser. No. 425,698
Int. Cl.[5] G02B *5/32*
U.S. Cl. 350—3.7 **15 Claims**



1. A laser protection visor for a user having an expected interpupillary distance for protection against at least one laser threat each having a corresponding expected wavelength, said laser protection visor comprising:

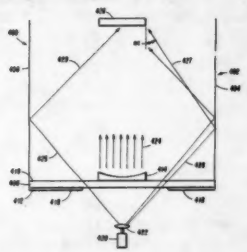
a transparent substrate formed in a substantially ellipsoidal segment, said ellipsoidal segment having foci disposed at least as far apart as the expected interpupillary distance, said transparent substrate disposed so that the major axis of said ellipsoidal segment is substantially coincident with a line connecting the center of the user's eyes;

at least one modulated index of refraction layer disposed on one surface of said transparent substrate, each modulated index of refraction layer having embedded therein a spatially modulated index of refraction disposed everywhere parallel to the surface of said modulated index of refraction layer for forming a reflection filter element having a bandwidth including a corresponding expected wavelength thereby forming a virtual mirror surface everywhere coincident with said transparent substrate.

4,978,183
HOLOGRAPHIC OPTIC ELEMENT COLLIMATOR AND METHOD AND APPARATUS FOR MANUFACTURE

Gerald L. Vick, Mount Vernon, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 16, 1989, Ser. No. 366,812
Int. Cl.[5] G03H *1/10*
U.S. Cl. 350—3.67 **6 Claims**



4. An apparatus comprising:

an optical chamber having a front end, a back end and a lateral wall extending between said front end and said back end;

said lateral wall having a reflective surface thereon for reflecting laser light;

said front end having a light transmissive characteristic for permitting the transmission of laser light therethrough;

an optical stop having a light transmissive characteristic which is relatively less transmissive as compared with said light transmissive characteristic of said front end;

a lens disposed on said front end for collimating light from a diverging light source;

a laser for emitting coherent light toward said front end of said optical chamber;

a beam expander disposed between said laser and said front end of said optical chamber for providing a divergent light source from said laser; and,

a holographic recording medium disposed within said optical chamber between said front end and said back end.

4,978,184
LASER RASTER SCANNER HAVING PASSIVE FACET TRACKING

Ronald J. Straayer, South Windsor, Conn., assignor to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed Oct. 20, 1988, Ser. No. 260,476
Int. Cl.[5] G02B *26/10*
U.S. Cl. 350—6.3 **13 Claims**

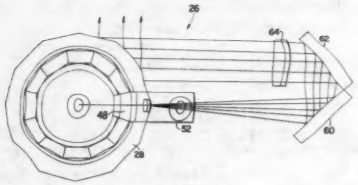
1. In a laser raster scanner that scans, in response to control signals from a controller, an exposure beam across a substrate by means of a rotating polygonal mirror having a plurality of reflective facets, an apparatus for providing passive facet tracking, comprising:

an optical displacement means including a plurality of glass

windows, each window having a fixed position relative to an associated one of the reflective facets;

a first beam steering means for providing the laser beam along an axis to said windows at a first surface thereof;

a second beam steering means for receiving said laser beam from an opposed second window surface and providing an



illumination beam to said corresponding one of said reflective facets; and

each of said glass windows positioned to displace said laser beam from said incident axis so as to produce a corresponding displacement of said illumination beam incident on the facet in the direction of mirror rotation.

4,978,185

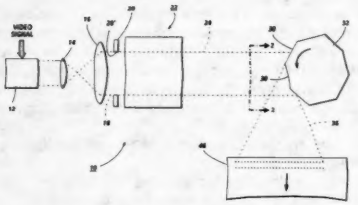
RASTER SCANNING SYSTEM UTILIZING OVERFILLED POLYGON FACET DESIGN WITH NON-REFLECTIVE FACET EDGES

James J. Appel, Brighton, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 25, 1989, Ser. No. 426,350

Int. Cl.[5] G02B *26/08*; H04N *3/08*

U.S. Cl. 350—6.8 **2 Claims**



1. A raster scanning system utilizing a plurality of overfilled polygon facets for forming latent images at a photosensitive medium comprising:

a laser light source for providing a modulated output light beam, said output light beam directed along an optical path which extends from the light source to said photosensitive medium;

means for expanding the modulated beam;

means for focusing the expanded modulated beam to a controlled energy distribution beam; and

a polygon having at least one reflective facet positioned in the optical path of said modulated beam and adapted to scan said beam across said medium, each of said facets characterized by having a vertical strip adjacent each edge, said strip extending the full height of the facet, each strip coated with a non-reflective material.

4,978,186

LIGHT RADIATION DEVICE FOR USE IN MEDICAL TREATMENT

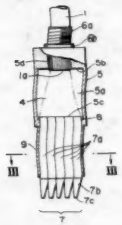
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-Ku, Tokyo, Japan

Filed Jul. 17, 1989, Ser. No. 380,954

Claims priority, application Japan, Sep. 26, 1988, 63-239953

Int. Cl.[5] G02B *6/00*; F21V *7/04*; A61M *5/00*

U.S. Cl. 350—96.10 **13 Claims**



1. A light radiation device for treating a person's scalp, comprising a fiber optic cable means for transmitting visible light rays, said cable means having a light-emitting end, a light radiator means comprising a housing, said light-emitting end of said cable means being mounted on said housing, optical conductor means mounted on said housing at a position spaced from said light-emitting end, said optical conductor means having a light-receiving end spaced from said light-emitting end of said cable means such that light rays are transmitted from said light-emitting end to said light-receiving end, said optical conductor means comprising a plurality of elongated and parallel light-conductor elements each having a main portion and an end portion, enclosure means joined to said housing and disposed about said main portion of said conductor elements, said enclosure means having an outer end, said end portion of said conductor elements extending outwardly of said enclosure means beyond said outer end, each of said end portions of said conductor element being tapered to thereby define a plurality of tapered teeth, said tapered teeth being placeable on a person's scalp without being obstracted by said person's hair to effect light radiation of said person's scalp.

4,978,187

OPTICAL ELEMENT, OPTICAL DISC AND ROTARY ENCODER WITH THE OPTICAL ELEMENT

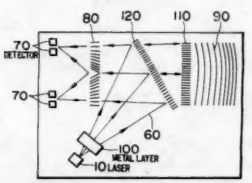
Hiroyuki Minemura; Yoshio Sato, both of Hitachi; Nobuyoshi Tsuboi, Ibaraki; Hiroaki Koyanagi, Katsuta, and Shinji Ohyama, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,171

Claims priority, application Japan, May 27, 1988, 63-129935

Int. Cl.[5] G02B *6/12, 6/10*; G11B *3/90, 5/09*

U.S. Cl. 350—96.11 **22 Claims**



1. An optical element comprising:

an optical waveguide for propagating an emission light from a light source;

an optical path changing means for leading the emission light from the optical waveguide to an external space, converging the thus led emission light onto an information recording medium, and introducing a reflective light reflected from the information recording medium into the optical waveguide;

a beam splitter means for branching the reflective light, introduced by said optical path changing means, away from the optical path of the emission light and for directing the branched light into light detecting means;

a filter means for allowing one of TE-polarized light and TM-polarized light to pass therethrough, said filter means being located in an optical path from said light source to said optical path changing means; and

a polarization switching means for changing a polarized state of light by allowing the light to reciprocatingly pass therethrough, said switching means being situated in an optical path between said optical path changing means and said information concerning medium;

wherein at least one of said filter means and said polarization switching means is disposed for preventing reflective light from the information recording medium from being received by said light source so as to enable improvement of a S/N ratio of a reproduced signal.

4,978,188

INTEGRATED OPTICAL DEVICE AND METHOD FOR MANUFACTURING THEREOF

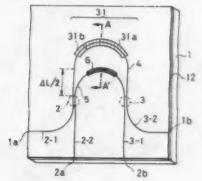
Masao Kawachi, Mito; Norio Takato, Katsuta; Kaname Jinguji; Akio Sugita, both of Mito, all of Japan, and Shin Sumida, Columbus, Ohio, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Division of Ser. No. 211,556, Jun. 24, 1988, Pat. No. 4,900,112. This application Oct. 13, 1989, Ser. No. 421,400

Claims priority, application Japan, Jun. 29, 1987, 162164; May 16, 1988, 116938

Int. Cl.[5] G02B *6/12*

U.S. Cl. 350—96.12 **19 Claims**



1. A method for manufacturing an integrated optical device, comprising the steps of:

forming a single-mode optical waveguide on a substrate, said single-mode optical waveguide having a core portion embedded in a cladding layer for transmitting light therethrough; and

forming, on said cladding layer, a stress applying film so that said stress applying film exhibits residual stress, for exerting a stress on said single-mode optical waveguide and for irreversibly changing the stress by trimming said stress applying film.

4,978,189

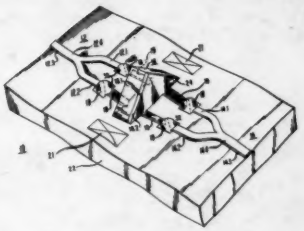
HYBRID OPTICAL ISOLATOR, CIRCULATOR OR SWITCH, AND SYSTEMS UTILIZING SAME

Greg E. Blonder, Summit; Charles H. Henry, Montgomery Twp., Somerset County; Rudolf F. Kazarinov, Martinsville, and Raymond Wolfe, New Providence, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 14, 1989, Ser. No. 436,169

Int. Cl.[5] G02B *5/30*

U.S. Cl. 350—96.12 **17 Claims**



1. An optical circulator/isolator/switch comprising

first and second substrate-supported, thin film waveguide means adapted to function as polarization splitters/combiners, and

polarization rotation means disposed between said first and second waveguide means, said rotation means comprising a non-reciprocal 45° polarization rotator and a reciprocal 45° polarization rotator arranged in tandem,

whereby light of arbitrary polarization propagating through said circulator/isolator in one direction is split into its TE and TM components by said first waveguide means, the polarization of the components experiences a net rotation of essentially 90° in passing through said rotator and the TE and TM components are re-combined by said waveguide means, but light of arbitrary polarization propagating in the opposite direction is split into its TE and TM components by said second waveguide means, the polarization of the components experiences a net rotation of essentially 0° in passing through said rotator and the TE and TM components are radiated out of said first waveguide means.

4,978,190

SERVO-CONTROLLED LIGHT COUPLING BETWEEN A LIGHT-EMITTING COMPONENT AND AN OPTICAL FIBER

Gustav Veith, Hemmingen, Fed. Rep. of Germany, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Sep. 8, 1989, Ser. No. 404,770

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831839

Int. Cl.[5] G02B *6/32, 6/26, 6/36*; H01J *5/16*

U.S. Cl. 350—96.18 **9 Claims**

1. Optical module comprising:

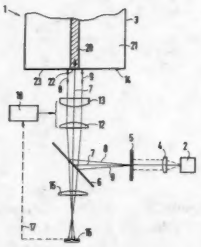
an optoelectronic transmitter for emitting a beam of light,

an optical fiber terminated by an end face on which is defined a core region surrounded by a second region having a reflection factor higher than that of the core region,

adjustable coupling means for adjustably positioning the light beam from the optoelectronic light transmitter relative to the end face of the optical fiber, wherein the position of the light beam relative to the core region is adjusted to an optimum position in which a central portion of the light beam is coupled into the optical fiber with minimum loss, and

control means responsive to an electrical control signal for adaptively adjusting the coupling means to maintain said optimum position, said control means further comprising:

a detector having at least two opposing sectors fixedly positioned relative to said end face such that when said light beam is in said optimum position, approximately equal peripheral portions of said light beam are reflected onto each of said sectors from said second region, and such that as the reflected light beam portions shift in a first predetermined direction from a first sector to an opposing second sector, less of the reflected peripheral light beam portion incident on the first sector is reflected from said higher reflectivity region and more of said incident light beamm portion is reflected from the lower reflectivity core region, and



means for generating said electrical control signal in response to the intensity of the reflected light beam portions incident on said opposing sectors,

whereby any differences between the electrical outputs from two opposing sectors resulting from movement of a reflected light beam portion from a first position incident the first sector to a second position incident on the second sector is magnified by said reflectivity differences of the two end face regions, and

whereby as a particular portion of the light beam which is reflected onto a particular sector moves from a first position such that it is reflected from the higher reflectivity second region to a second position where it is reflected off the lower reflectivity core region, a control signal representative of such movement is obtained from the sectors.

4,978,191

CONNECTOR DEVICE

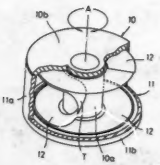
Masahiro Hasegawa, and Seiichi Ueno, both of Kameyama, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Feb. 8, 1990, Ser. No. 477,302

Claims priority, application Japan, Feb. 14, 1989, 1-34560

Int. Cl.[5] G02B *6/36*; H01R *39/02, 35/00*

U.S. Cl. 350—96.20 **20 Claims**



1. A connector device comprising:

a first housing mounted on a stationary member and a second housing mounted on a rotating member, at least one of said housings having a rotating shaft, said two housings being capable of relatively rotating for a plurality of turns around the rotating shaft; and

at least one flexible transmission member having one end fixed to the first housing and the other end fixed to the second housing, and housed in a holding portion defined by the two housings,

said transmission member being coiled in a spiral pile around the axis of rotation of the two housings, turned back in the middle thereof, and coiled in a spiral pile in the opposite direction from a U-turn portion at which the transmission member is turned back.

4,978,192

RECEPTACLE FOR AT LEAST ONE LIGHT WAVEGUIDE CONNECTOR

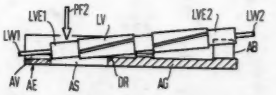
Lothar Finzel, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 26, 1989, Ser. No. 371,614

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1988, 3822894

Int. Cl.[5] G02B *6/38*

U.S. Cl. 350—96.21 **16 Claims**



1. A receptacle for at least one light waveguide connector, said receptacle having a member being provided with means for grasping only one end of the light waveguide connector and, said member having support means for supporting and engaging a sub-region of the light waveguide connector spaced from the one end held in the means for grasping, said sub-region being approximately a middle region of the light waveguide connector.

4,978,193

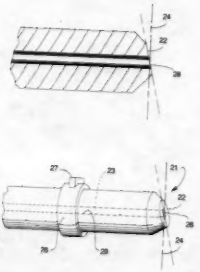
OPTICAL FIBER CONNECTOR WHICH PROVIDES A HIGH SIGNAL RETURN LOSS

Akira Tomita, Redwood City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Aug. 24, 1989, Ser. No. 398,109

Int. Cl.[5] G02B *6/38*

U.S. Cl. 350—96.21 **15 Claims**



5. An optical fiber connector, comprising:

first and second optical fiber contacts, the contacts including respective first and second optical fibers each of which includes a glass core surrounded by a glass cladding, the contacts including first and second respective end faces

which are substantially flat and which are inclined by several degrees from a plane orthogonal to a longitudinal axis of the first and second optical fibers respectively, each end face being made of a material having a hardness which is greater than that of each optical fiber, ends of the fibers being substantially coplanar with their respective contact end face, each optical fiber being disposed within a longitudinal bore within its respective contact;

means for aligning and holding the contacts such that the respective optical fiber ends are in an opposing confronting attitude.

4,978,194

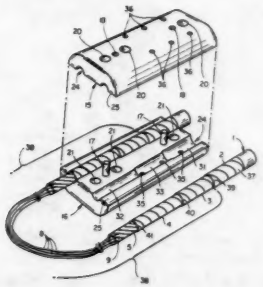
STEPPED CABLE BLOCK

Dennis Allen, San Ramon; Donald Del Fava, San Carlos; Harold D. Geesey, Belmont; Lowell I. Koht, Foster City; Mark S. McClintic, Dublin; Dean A. Newton, Fremont, and Timothy L. Petro, Sr., Pleasanton, all of Calif., assignors to Raynet Corporation, Menlo Park, Calif.

Filed Aug. 28, 1989, Ser. No. 399,689

Int. Cl.[5] G02B *6/44*

U.S. Cl. 350—96.23 **21 Claims**



15. An optical fiber cable block for an optical fiber containing optical fibers therein, comprising:

an optical fiber cable having at least an outer sheath and an inner sheath and at least one optical fiber disposed therewithin, a first section of the cable having a longitudinal length of the outer sheath removed therefrom so as to expose at least one inner cable sheath therebeneath along a second cable section which is shorter than the first cable section and collinear therewith;

first and second engagable and disengagable half shell members, each half shell member containing at least one longitudinal stepped semicylindrical channel therein disposed so as to extend from a surface of each member which are engageable with each other, the members when engaged forming at least one longitudinal stepped cylindrical channel therein, first and second longitudinal portions of the channel having step diameters having a size similar to that of the cable outer and inner sheath respectively, the first and second half shell members being disposed around the cable such that a first length of the exposed inner sheath is disposed within the first channel portion and an unstripped portion of the cable is disposed within the second channel portion, the inner sheath first length being shorter than the second cable section;

means for compressingly urging the first and second half shell members together so as to sealingly engage the inner and the outer sheaths in the first and second channel portions respectively.

4,978,195

OPTICAL-TO-ELECTRIC IMAGE CONVERSION SYSTEM EMPLOYING A CATHODE-RAY TUBE OR THE LIKE

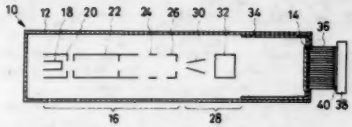
Koshi Takano, Sagamihara, and Kazuya Suda, Tokyo, both of Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1989, Ser. No. 440,655

Claims priority, application Japan, Dec. 7, 1988, 63-309630; Dec. 9, 1988, 63-311070

Int. Cl.[5] G02B *6/08*; H01J *31/50*; H04N *3/14*

U.S. Cl. 350—96.27 **6 Claims**



1. An optical-to-electric image conversion system comprising:

(a) electron beam means having a screen for the visible presentation of an optical image;

(b) a fiber optics faceplate comprising a multiplicity of optical fibers held parallel to each other and having a light entrance side and a light exit side, the light entrance side of the fiber optics faceplate being held against the screen of the electron beam means for the transmission of the optical image created thereon;

(c) an image sensor having a light entrance face held opposite the light exit side of the fiber optics faceplate for translating the incoming image from optical to electric form; and

(d) a transparent layer of electrically conducting material interposed between the fiber optics faceplate and the image sensor in order to prevent the localized electrification of the light exit side of the fiber optics faceplate.

4,978,196

DISPLAY APPARATUS FOR A VEHICLE

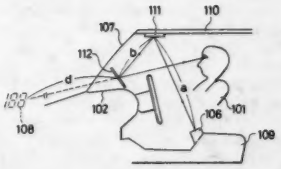
Yoshiyuki Suzuki, and Kunimitsu Aoki, both of Susono, Japan, assignors to Yazaki Corporation, Japan

Continuation of Ser. No. 181,583, Apr. 14, 1988, abandoned. This application May 30, 1989, Ser. No. 358,516

Claims priority, application Japan, Apr. 15, 1987, 62-090724; Apr. 15, 1987, 62-090725; Apr. 24, 1987, 62-061476

Int. Cl.[5] G02B *27/14*

U.S. Cl. 350—174 **20 Claims**



1. A display apparatus in an automotive vehicle comprising:

a display unit producing a visual display pattern;

a driver's seat within said automobile;

a projecting face in front of said driver's seat;

a windshield in front of said driver's seat, said windshield having a driver's seat side;

a ceiling at least partially located above said driver's seat;

a vehicle dashboard in front of said driver's seat;

means disposed within said vehicle for projecting a display

pattern provided by the display unit onto the projecting face in front of the driver's seat;

means for visually overlapping an outer landscape in front of the windshield and a virtual image of the display pattern provided by the means for projecting;

first flat mirror means for reflecting light from the means for projecting; and

second flat mirror means, disposed on the vehicle dashboard, for reflecting light reflected from the first mirror means on the driver's seat side of the windshield such that the virtual image of the display pattern in front of the second mirror means is visualizable;

wherein the first flat mirror means is disposed on the ceiling of the automotive vehicle in order to lengthen a display optical path from the projecting means to the second flat mirror means without providing any lens therebetween, whereby the virtual image of the display pattern can be produced at a position relatively far from a driver in front of the windshield, whereby the driver can realize the virtual image on the landscape within his normal driving focal range.

4,978,197

BEAM-COMBINING LASER BEAM SOURCE DEVICE

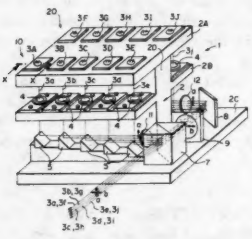
Kazuo Horikawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 24, 1989, Ser. No. 397,817

Claims priority, application Japan, Aug. 26, 1988, 63-212233

Int. Cl.[5] G02B *27/14, 7/02*

U.S. Cl. 350—174 **6 Claims**



1. A beam-combining laser beam source device comprising a first laser beam source section and a second laser beam source section, each of which comprises:

(i) a plurality of laser beam sources,

(ii) a collimator optical system positioned in each of the optical paths of respective laser beams, which are radiated from the laser beam sources, in order to collimate the laser beams, and

(iii) optical path adjusting elements respectively positioned in the optical paths of the laser beams in order to radiate the laser beams along optical paths parallel and close to one another,

so that the laser beams radiated from the first laser beam source section and the second laser beam source section are caused to impinge upon a beam-combining optical element from different directions and are combined by the beam-combining optical element, the beam-combining optical element reflecting the laser beams radiated from one of the first laser beam source section and the second laser beam source section and transmitting the laser beams radiated from the other of the first laser beam source section and the second laser beam source section,

wherein each of said collimator optical systems of said first laser beam source section and said second laser beam source section is constituted of lens groups, each of which is composed of a plurality of lenses corresponding to each of said laser beam sources, and a common lens positioned so that the laser beams, which have been radiated from said optical path adjusting elements along the optical paths parallel and close to one another, impinge upon said common lens,

the common lens of said first laser beam source section is moveable along a first direction which is parallel to the optical axis of said common lens, and along a second direction which is normal to said optical axis,

the common lens of said second laser beam source section is moveable along a first direction which is parallel to the optical axis of said common lens, and along a second direction which is normal to said optical axis, and

the laser beams which have been radiated from said first laser beam source section and the laser beams which have been radiated from said second laser beam source section are moved along directions normal to each other in the optical paths of the laser beams, which have been combined, by the movement of said common lens of said first laser beam source section along said second direction and the movement of said common lens of said second laser beam source section along said second direction.

4,978,198

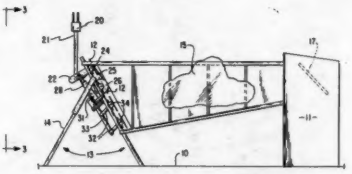
LIGHT FOCUSING MECHANISM

Leon C. Jalas, R.R. 1, Sutherland, Iowa 51058

Filed Oct. 31, 1989, Ser. No. 429,625

Int. Cl.[5] G02B *17/00, 27/00*

U.S. Cl. 350—259 **12 Claims**



1. A system for reflecting rays from an exterior source into a structure comprising means on said structure for receiving said rays, principal reflecting means including at least one adjustable reflector, and side auxiliary reflecting means extending from said principal reflecting means to said means of receiving rays, said auxiliary reflecting means being adapted to reflect any light rays extending to the side so that all rays are retained between said side auxiliary means to be reflected into said structure for receiving the rays.

4,978,199

FINDER OPTICAL SYSTEM

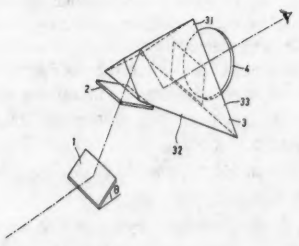
Hiromu Mukai, and Etsuko Nakai, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 13, 1989, Ser. No. 365,337

Claims priority, application Japan, Jun. 14, 1988, 63-147538

Int. Cl.[5] G02B *5/04;* G03B *9/40*

U.S. Cl. 350—286 **6 Claims**



1. A finder optical system comprising:

a first reflecting surface disposed at an image side of an objective lens to reflect light flux passing through the objective lens upward relative to an optical axis of the objective lens towards an exit pupil side;

a roof surface consisting of two reflecting surfaces orthogonally intersecting each other which is disposed, on the exit pupil side of said first reflecting surface, to perform a right-left inversion of the light flux reflected by said first reflecting surface and to reflect the light flux downward towards the exit pupil side; and

a second reflecting surface disposed downward relative to said roof surface to perform an up-down inversion of the light flux reflected downward toward the exit pupil side by said roof surface and to reflect the light flux towards an eyepiece, wherein the finder optical system fulfills the following condition:

$$20° < \theta < 40°$$

wherein, θ represents an angle made by said first reflecting surface and the optical axis of the objective lens.

4,978,200

OPTICAL IMAGE ROTATORS

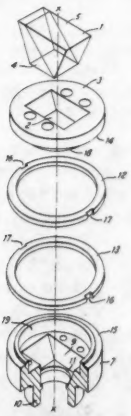
Terence F. Dean, Ruislip, England, assignor to Thorn EMI plc, London, England

Filed Sep. 28, 1988, Ser. No. 250,169

Claims priority, application United Kingdom, Oct. 2, 1987, 8723209

Int. Cl.[5] G02B *7/18, 27/64*

U.S. Cl. 350—287 **5 Claims**



1. An optical image rotator assembly comprising:

an optical rotator for the rotative processing of light passing therethrough and having a mounting member, a housing member for the assembly, one of the said members defining the optical axis of the assembly and the other of the said members defining the rotational axis of the assembly, the mounting member and the housing member being engagable in a first position in which the optical axis and the rotational axis are aligned, and alteration means to alter the alignment from that in the first position in order to provide at least one alternative position of the members in which tha axes are not aligned, said alteration means comprising a ring of differing thickness over the circumference for engagement with a second ring of differing thickness over the circumference.

4,978,201

METHOD FOR MEASURING SPLICE LOSS OF AN OPTICAL FIBER

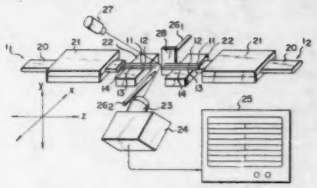
Takeshi Yamada; Tsutomu Onodera, and Hiroyuki Taya, all of Sakura, Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 302,617

Claims priority, application Japan, Jan. 30, 1988, 63-20022

Int. Cl.[5] G02B *6/255, 6/38*

U.S. Cl. 350—320 **7 Claims**



2. A method of estimating a split loss of a spliced portion of an optical fiber formed by fusion-splicing a pair of optical fibers through heat treatment, which method comprises the steps of:

acquiring a splice loss from an amount of axial deviation upon completion of heat treatment on a pair of optical fibers, a splice loss from an amount of angular deviation upon completion of heat treatment on said optical fibers, and a splice loss originating from opposite-phase core distortion from a difference between a first amount of axial deviation attained prior to or immediately after heating said optical fibers and a second amount of axial deviation attained upon completion of heat treatment on said optical fibers; and

determining an entire splice loss by adding said splice losses obtained in said splice-loss acquiring step.

4,978,202

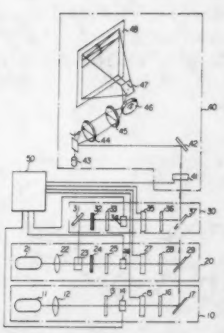
LASER SCANNING SYSTEM FOR DISPLAYING A THREE-DIMENSIONAL COLOR IMAGE

Keun Y. Yang, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed May 12, 1989, Ser. No. 351,049

Int. Cl.[5] G02F *1/13;* H04N *9/31*

U.S. Cl. 350—331 R **5 Claims**



1. A laser scanning system for displaying a three-dimensional color image on a screen, comprising:

red light emitting means for generating red light;

said red light emitting means including;

a helium-neon laser;

a first collimator;

a first polarized light plate;

a first optical-frequency modulator;

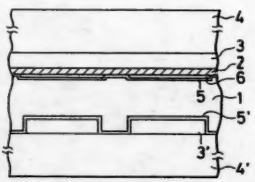
a first liquid crystal plate;
a second polarized light plate; and
a first reflecting mirror;
green light emitting means for generating green light;
said green light emitting means including;
an argon laser;
a second collimator;
a beam splitter;
a green filter;
a third polarized light plate;
a second optical-frequency modulator;
a second liquid crystal plate;
a fourth polarized light plate; and
a first special wavelength reflecting mirror;
blue light emitting means for generating blue light;
said blue light emitting means including;
a reflecting mirror;
a blue filter;
a fifth polarized light plate;
a third optical-frequency modulator;
a third liquid crystal plate;
a sixth polarized light plate; and
a second special wavelength reflecting mirror;
said red light emitting means, said green light emitting means, and said blue light emitting means producing a laser beam;
scanning means for scanning said laser beam produced by said red light emitting means, said green light emitting means, and said blue light emitting means including;
a fourth liquid crystal plate;
a second reflecting mirror;
a galvanometer;
a first lens;
a second lens;
a rotating mirror;
a third reflecting mirror; and
controller means for controlling said first, second, and third optical-frequency modulators and said first, second, and third liquid crystal plates to a three-dimensional color image on the screen.

4,978,203

LIQUID CRYSTAL DEVICE WITH AN APPARENT HYSTERESIS

Shunpei Yamazaki, Tokyo; Takashi Inujima, Atsugi; Toshiji Hamatani, Atsugi; Toshimitsu Konuma, Atsugi; Mitsunori Sakama, Hiratsuka; Ippei Kobayashi, Atsugi, and Toshiharu Yamaguchi, Zama, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Continuation of Ser. No. 775, Jan. 6, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 295,008
Claims priority, application Japan, Jan. 7, 1986, 61-1152
Int. Cl.[5] G02F *1/13*
U.S. Cl. 350—339 R **7 Claims**



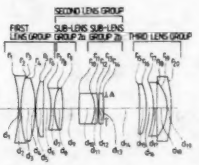
1. A liquid crystal device comprising:
first and second substrates, at least one of which is transparent;
a liquid crystal layer disposed between said substrates;
first and second electrodes respectively formed on the inside surfaces of said first and second substrates where said first and second electrodes are opposed to each other in order to define a plurality of pixels such that at each pixel an electric field may be applied through the liquid crystal layer;
at least one floating electrode in each said pixel, each floating electrode being substantially closer to its associated first electrode than its associated second electrode; and
a ferroelectric thin film made of an organic material comprising fluorine and electrically isolating said floating electrode and said first electrode.

4,978,204

HIGH ZOOM-RATIO ZOOM LENS SYSTEM FOR USE IN A COMPACT CAMERA

Takayuki Ito, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushik Kaisha, Tokyo, Japan

Filed Sep. 7, 1989, Ser. No. 404,399
Claims priority, application Japan, Sep. 8, 1988, 63-225294; Dec. 27, 1988, 63-330469; May 23, 1989, 1-129556
Int. Cl.[5] G02B *15/14, 9/64*
U.S. Cl. 350—423 **24 Claims**



1. A high zoom ratio zoom lens for a compact camera, comprising, in order from the object side, a first lens group having a positive focal length, a second lens group having a positive focal length, and a third lens group having a negative focal length,
wherein, when zooming is carried out from a wide angle side to a telephoto side, the first, second and third lens groups are all moved toward the object side so that a distance between the first and second lens groups in increased and a distance between the second and third lens groups is decreased,
said zoom lens satisfying the following conditions:
(A) said second lens group being composed, in order from the object side, of a sub-component *2a* having a negative focal length and a sub-component *2b* having a positive focal length,
(B) a stop diaphragm being disposed between said second and third lens groups and being moved in unison with said second lens group during zooming, and
(C) said stop diaphragm being separatable from said second lens group and being positionally fixed during focusing.

4,978,205

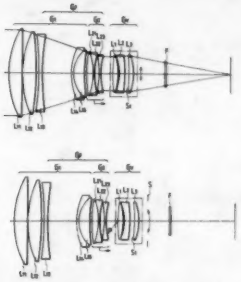
VIBRATION-ISOLATING OPTICAL SYSTEM

Susumu Sato, Chiba, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Mar. 2, 1990, Ser. No. 487,307
Claims priority, application Japan, Mar. 7, 1989, 1-54470
Int. Cl.[5] G02B *15/14, 7/02*
U.S. Cl. 350—423 **18 Claims**

1. A vibration-isolating optical system having an image stabilizing function, comprising:
a fixed lens optical system having a plurality of lens groups which are arranged to be stationary in the vertical direction with respect to the optical axis; and
a vibration-isolating compensating optical system disposed adjacently to the image of said fixed lens optical system and arranged to be movable in a direction intersecting said optical axis, wherein said vibration-isolating compensating optical system is constituted by, in sequence order

from the portion adjacent to the object, a first factor formed by a double convex positive lens, a second factor formed by a negative lens whose concave confronts the object and a third factor formed by a positive lens, said vibration-isolating compensating optical system being



arranged so as to meet the following relationships, assuming that the power (the reciprocal of the focal length) of the overall body of said vibration-isolating compensating optical system is ϕ, the power of said first factor is ϕ_1, the power of said second factor is ϕ_2 and the combination power of said first factor and said second factor is ϕ_{12}:

$$|\phi_{12}| \leqq 0.3\,\phi$$

$$-0.5 \leqq \frac{\phi}{\phi_2} + 1 \leqq 1.0$$

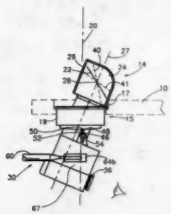
$$-0.3 \leqq \frac{\phi_2}{\phi_1} + 1 \leqq 0.3.$$

4,978,206

PERISCOPIC SIGHT WITH SUPPORT MEANS FOR ELEVATION ADJUSTMENT MOUNTED WITHIN SUPPORT MEANS FOR AZIMUTHAL ADJUSTMENT

Benzion Neuman, Moshav Hemed, and Benjamin Shnarch, Bat Yam, both of Israel, assignors to Israel Aircraft Industries, Ltd., Israel

Filed Jul. 25, 1989, Ser. No. 384,717
Claims priority, application Israel, Aug. 2, 1988, 87305
Int. Cl.[5] G02B *23/08, 23/16*
U.S. Cl. 350—543 **20 Claims**



1. A periscopic sight comprising:

a base having a mounting aperture defining a first axis,

first support means mounted in association with said mounting aperture for rotation therein about said first axis, said first support means permitting azimuthal rotation and defining a second axis substantially perpendicular to said first axis;

second support means mounted in said first support means and rotating about said second axis said second support means permitting movement in elevation; and

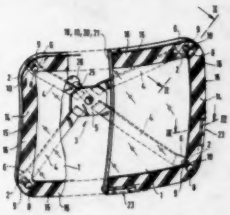
a periscope extending through said mounting aperture, defining a longitudinal axis and mounted within said second support means for rotation about said second axis between predetermined limits and about said first axis.

4,978,207

TRAFFIC MIRROR

Manfred Gillner, Aachen; Josef Wlaschitsch, Bietigheim, both of Fed. Rep. of Germany, and Werner Nuding, deceased, late of Bietigheim, Fed. Rep. of Germany (by Ursula Nuding, legal representative), assignors to Vegla Vereinigte Glaswerke GmbH, Aachen, Fed. Rep. of Germany

Filed Jun. 7, 1989, Ser. No. 362,761
Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 3821997; Feb. 14, 1989, 8901679[U]
Int. Cl.[5] G02B *7/18*
U.S. Cl. 350—631 **27 Claims**



1. A traffic mirror, comprising:

a spherically curved glass pane having a front surface, a rear surface, and an outer periphery,

a metal reflective layer located on the rear surface of said glass pane,

said glass pane including a decorative border comprising a layer of an enamel-like material located directly on said front surface of said glass pane, and along said outer periphery, and

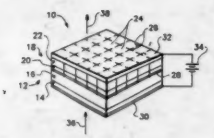
a supporting structure for mounting said traffic mirror on a mounting structure, said supporting structure comprising at least two supporting struts each having first and second ends, said supporting struts being attached at their first ends directly to said outer periphery of said glass pane and at their second ends to said mounting structure.

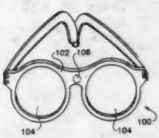
4,978,208

PHOTOELECTRONIC DIODE SPATIAL LIGHT MODULATOR AND EYE PROTECTION GOGGLES INCORPORATING THE SAME

Tsung-Yuan Hsu, Westlake Village; Shin-Tson Wu, Northridge, and Robert Y. Loo, Los Angeles, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 24, 1989, Ser. No. 383,698
Int. Cl.[5] G02C *7/10*; G02F *1/015*
U.S. Cl. 351—45 **23 Claims**





17. Eye protection goggles, including frame means, and at least one opaque eyepiece means supported by the frame means, each of said at least one eyepiece means comprising:

a photoconductive member;

a photoemitting diode array including a plurality of photoemitting diodes which are electrically and optically isolated from each other and electrically connected to respective sections of the photoconductive member; and

first and second transparent electrodes which sandwich the photoconductive member and photoemitting diode array therebetween and are electrically connected thereto respectively.

4,978,209

HINGE FOR SPECTACLE FRAME

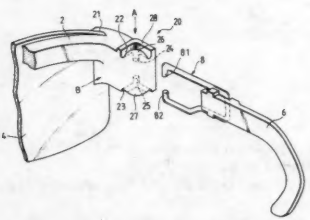
Toyohiro Ohba, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 340,666

Claims priority, application Japan, Apr. 27, 1988, 63-56940[U]

Int. Cl.[5] G02C *5/22*

U.S. Cl. 351—153 **5 Claims**



1. In a spectacle frame having a front rim with two opposite end portions and, at each said end portion, a respective temple member connected to said front rim by a corresponding hinge for pivotal movement about a corresponding pivot axis between an open position where said temple member extend rearwardly with respect to said front rim for use and a closed position where said temple member extends along said front rim for storage, the improvement wherein said hinge comprises:

an elastic wire member having a pair of arms extending substantially longitudinally of said temple member and attached to said temple member for movement therewith about said pivot axis between two positions respectively corresponding to said open position and said closed position of said temple member, each arm having a shaft portion bent therefrom along said pivot axis, and

a bearing member provided on the corresponding end portion of said front rim, said bearing member including bearing means formed along said pivot axis to receive said shaft portion of each arm, and projection means arranged in a path of movement of at least one of said arms between said two positions for abutting said one arm and elastically deforming said one arm along said pivot axis during movement of said one arm from each of said two positions to the other.

4,978,210

RETAINER FOR EYEWEAR

Michael W. Lundbeck, 440 Quail Run Rd., Aptos, Calif. 95003

Filed Jul. 18, 1989, Ser. No. 381,521

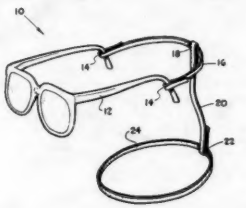
Int. Cl.[5] G02C *3/00*

U.S. Cl. 351—157 **3 Claims**

1. A retainer for holding eyewear securely in place on a person's head, comprising:

a first elongated strap in a preadjusted length position for engagement around the head of a person, said elongated strap containing means for engaging the bows of eyewear;

a second elongated strap in a preadjusted length position for engagement around the neck of a person containing means for engaging said first elongated strap; and



a third elongated strap member connecting the midsections of said first and said second elongated straps.

4,978,211

LARGE DIAMETER POSITIVE POWER OPHTHALMIC LENS

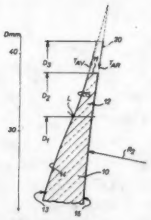
Daniel Cornu; Christian Harsigny, both of Yerres, and Jean Thiebaut, Paris, all of France, assignors to Essilor International Cie Generale d'Optique, Creteil Cedex, France

Filed Oct. 10, 1989, Ser. No. 419,536

Claims priority, application France, Oct. 20, 1988, 88 13772

Int. Cl.[5] G02C *7/02;* G02B *13/18*

U.S. Cl. 351—159 **5 Claims**



1. Positive power ophthalmic lens having a central optically active area the diameter of which is at most equal to the diameter of the contour and an optional peripheral merging area around said central optically active area and between it and said geometrical contour, in which lens the diameter D_1 in millimeters of said central optically active area is related to the power P of the lens in diopters by a general equation of the type:

$$D_1 = a - b.P$$

where a is a numerical parameter taking a value between 84 and 89 and b is a numerical parameter taking a value between 4 and 4.9.

4,978,212

OPTHALMOMETER

Edwin A. Hazard, Rochester, N.Y., assignor to Amarel Precision Instruments, Inc., Fairport, N.Y.

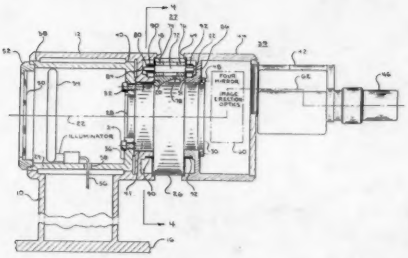
Filed Dec. 21, 1989, Ser. No. 458,255

Int. Cl.[5] A61B *3/10*

U.S. Cl. 351—212 **14 Claims**

1. In an opthalmometer having a rotatable assembly of first optics for projecting light upon the eye of a subject and receiving light reflected from the cornea of the eye, which optics is adjustable for measurement of the curvature of the cornea, and having a second assembly of second optics for viewing of an image resulting from said reflected light, a mechanism for

stabilizing the position in space of the assembly of viewing optics when said rotatable assembly of first optics is rotated, which mechanism comprises a support on which said first optics is mounted for rotation about an axis, means mounting said second optics for rotation relative to said first optics about



said axis, a shaft rotatably disposed eccentrically of said axis and rotatable with said first optics, said shaft being coupled to said support for rotation as said first optics rotates, said shaft also being rotatably coupled to said second optics to stabilize said second optics in angular position with respect to said support while said . first optics rotates.

4,978,213

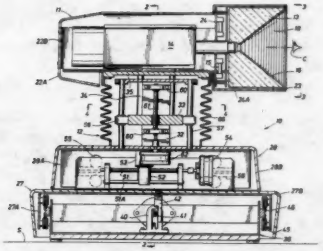
APPARATUS FOR DETERMINING THE CONTOUR OF THE CORNEA OF A HUMAN EYE

Sami G. El Hage, 5417 Del Monte, Houston, Tex. 77056

Continuation of Ser. No. 89,535, Aug. 16, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,680

Int. Cl.[5] A61B *3/10*

U.S. Cl. 351—212 **8 Claims**



1. Apparatus for use in determining the contour of the cornea of a human eye, comprising a housing having an open end, a source of light within the housing, means within the housing for transmitting concentric rings of light from the source to the cornea of a human eye located at the open end of the housing, each ring being several pixels wide, camera means having a lens positioned with its optical axis coaxial to the rings of light reflected by the cornea and means to sense and display images of the rings that are reflected by the cornea, means for measuring the intensity of the light of each pixel across a profile of each reflected ring, means for determining the pixel in each ring that has the highest intensity of reflected light, and means for calculating the contour of the cornea using the pixel having the highest intensity of reflected light of each ring of light reflected by the cornea by fitting a mathematical curve to such pixels.

4,978,214

DISPLAY APPARATUS FOR AUTOMOTIVE VEHICLE

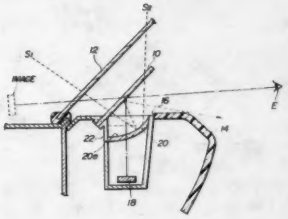
Hiroshi Kawata, 910, Ichisawa-cho, Asahi-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Nov. 12, 1987, Ser. No. 119,372

Claims priority, application Japan, Nov. 12, 1986, 61-267457

Int. Cl.[5] G03B *21/00*

U.S. Cl. 353—14 **11 Claims**



1. A display apparatus for an automotive vehicle having a vehicular instrument panel and a front windshield comprising:

a display screen;

an image source for forming an optical image and projecting the optical image onto said display screen for forming a virtual image thereof, said image source being disposed within an image source receptacle for projecting said image out of an opening in said receptacle;

a light shield means disposed at a predetermined position of said image source receptacle adjacent an optical path for transmitting the optical image from said image source to said display screen, for absorbing light beams irradiated thereon; and

a transparent cover covering said opening of said image source receptacle and allowing said optical image to pass therethrough, said transparent cover having a curved surface disposed to reflect a sun beam, the curvature of said curved surface being so selected as to provide a reflecting angle of said sun beam so that the sun beam is irradiated toward said light shield so as to avoid influence of said sun beam on the definition of the virtual image displayed on said display screen.

4,978,215

IMAGE PROJECTING SYSTEM

Osami Katoh, Sagamihara, and Hideaki Kusano, Machida, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 134,105, Dec. 17, 1987, Pat. No. 4,846,569. This application Jan. 4, 1989, Ser. No. 293,464

Claims priority, application Japan, Dec. 19, 1986, 61-303118; Dec. 19, 1986, 61-303119; Dec. 19, 1986, 61-303120

Int. Cl.[5] G03B *21/10*

U.S. Cl. 353—26 R **7 Claims**

1. An image projecting system employing a microfilm wound on a supply reel incorporated in a cartridge and projecting an image recorded on the microfilm onto an image receptor by irradiating the microfilm at a projecting position with light emitted from a light source, comprising:

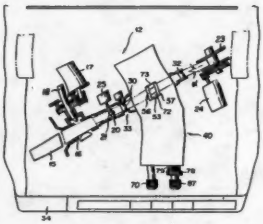
a housing having opposite side walls, a front face, and an angled wall positioned between one of said side walls and the front face, said angled wall being positioned at an angle with respect to said front face and said one side wall;

a receiving port for receiving said cartridge located in said angled wall;

a supply reel drive mechanism provided in the vicinity of said receiving port for driving the supply reel in the cartridge received in the receiving port;

a take-up reel for taking up the microfilm conveyed from said supply reel, said take-up reel located at a distance

from the front face of the housing at a side of said housing opposite one side wall so that a conveyance path for the microfilm extends inwardly diagonally across the housing from the receiving port, said diagonal conveyance path creating a space on each side of the conveyance path;



a take-up reel drive mechanism provided in the vicinity of said take-up reel for driving the take-up reel, wherein the microfilm passing said projecting position is conveyed between said supply and take-up reels at an angle with respect to the front face of said housing.

4,978,216

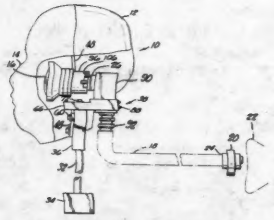
FIGURE WITH BACK PROJECTED IMAGE USING FIBER OPTICS

Gordon E. Liljegren, Burbank, and Eugene L. Foster, Monterey Park, both of Calif., assignors to Walt Disney Company, Glendale, Calif.

Filed Oct. 30, 1989, Ser. No. 429,180

Int. Cl.[5] G03B 21/26

U.S. Cl. 353—28 40 Claims



1. A figure, comprising:

(a) a body portion having a translucent surface;

(b) an image forming means inside the body portio for forming a visual image on the surface;

(c) an image source outside the body portion for providing an image;

(d) a bundle of flexible fiber optic strands coherently arranged to optically convey the image from the image source to the image forming means; and

(e) a section of the bundle inside the body portion adjacent to the image forming means being permanently formed at substantially a 90 degree angle and encased within a housing connected to the body portion.

4,978,217

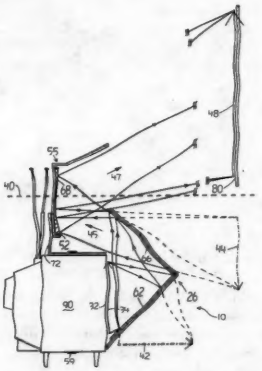
LUMINOUS SCREEN PROJECTOR

Kam T. Tam, Box 3135, Santa Clara, Calif. 95055

Filed Feb. 20, 1990, Ser. No. 482,225

Int. Cl.[5] G01B 21/28

U.S. Cl. 353—119 24 Claims



1. An apparatus for projecting an optical image from a luminous screen onto a remote viewing medium, comprising.

a frame adapted for mounting adjacent a luminous screen;

image inversion means disposed within said frame and having an image receiving end and an image exit end, said image receiving end being disposed adjacent the luminous screen such that an image from the luminous screen enters into said image receiving end as an upright and nonreversed image and exits as an inverted and nonreversed image from said image exit end; and

reflective projection means movably mounted on said frame at a distance from and confronting said image exit end of said image inversion means such that said inverted and nonreversed image enters into said reflective projection means and is reflected back by said reflective projection means as an enlarged, upright and nonreversed image onto the remote viewing medium.

4,978,218

FOLDING ARM FOR OVERHEAD PROJECTOR

Robert S. Carpenter; Ernesto M. Rodriguez, and Dennis J. Roden, all of Austin, Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 1, 1990, Ser. No. 486,971

Int. Cl.[5] G03B 21/00

U.S. Cl. 353—119 20 Claims

1. An apparatus for moving an optical system from a storage position to an operative position, comprising:

a mounting block;

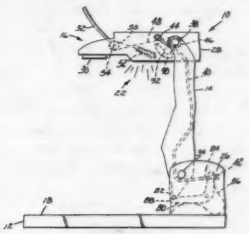
a support arm;

a torque member;

means for housing the optical system; and

means connecting said mounting block, said support arm, said torque member and said housing means whereby, as said support arm is moved from a storage state to an

operative state, said housing means moves from the storage position to the operative position, and said housing



means simultaneously rotates in the plane defined by the movement of said support arm.

4,978,219

SURFACE ROUGHNESS MEASURING APPARATUS UTILIZING DEFLECTABLE LASER BEAMS

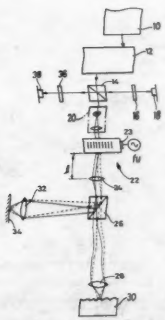
Yoshinori Beasho, Mie, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 1, 1989, Ser. No. 345,293

Claims priority, application Japan, May 6, 1988, 63-110678; May 6, 1988, 63-110679

Int. Cl.[5] G01B 9/02

U.S. Cl. 356—349 14 Claims



1. An optical surface roughness measuring apparatus for measuring the roughness of a surface of a subject in a non-contacting manner, based on a heterodyne interference wherein a phase of a measuring beat beam produced by a reference laser beam, and a measuring laser beam reflected by said surface of the subject and having a wavelength different from that of the reference laser beam is changed as a length of an optical path of said measuring laser beam is changed with a change in the surface roughness of the subject, comprising:

a laser source for producing two laser beams having mutually perpendicular polarization planes and different frequencies, and thereby providing a reference beat beam;

means for separating a first portion of said reference beat beam from the remaining second portion which serves as said reference and measuring laser beams providing said measuring beat beam;

lens device including an object lens for converging said measuring laser beam on said surface of the subject;

a deflector for deflecting said measuring laser beam before said measuring laser beam is incident upon said surface of the subject, thereby moving a point of convergence of said measuring laser beam on said surface of the subject in a direction parallel to said surface, while said subject is held stationary, and

a detecting circuit comprising a reference photosensor receiving said first portion of said reference beat beam and producing a reference beat signal, and a measuring photosensor receiving said measuring beat beam and producing a measuring beat signal whose phase is changed with a change in said length of said optical path thereof, said detecting circuit producing an output indicative of said roughness of the surface of the subject, based on a beat signal of the received reference and measuring beat signals.

4,978,220

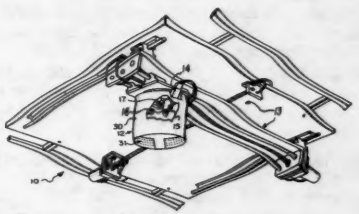
COMPENSATING SYSTEM FOR INSPECTING POTENTIALLY WARPED PRINTED CIRCUIT BOARDS

Abe Abramovich, Lawrenceville, and Gordon I. Robertson, Pennington, both of N.J., assignors to Cimflex Teknowledge Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 164,226, Mar. 4, 1988, abandoned. This application May 24, 1988, Ser. No. 198,156

Int. Cl.[5] G02B 7/11; H01L 21/66

U.S. Cl. 356—394 35 Claims



1. In an apparatus for inspecting a printed circuit board having components affixed thereto, to determine if said components are properly placed and if connecting leads or pins associated with said components are properly positioned, and including means for detecting whether said components and said connecting leads or pins are positioned in a prescribed location, and means for compensating for variations in the detecting of components and connecting leads or pins on a warped printed circuit board, the improvement comprising:

means for locating the position of a surface of said printed circuit board bearing said components and said connecting leads or pins;

means for comparing said located position with a reference standard, to detect deviation between said located position and said reference standard; and

means for adjusting said compensating means including means for altering said prescribed location according to said detected deviation.

4,978,221

LASER DISTANCE AND ALTITUDE MEASURING APPARATUS

Gunther Sepp, Ottobrunn, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 16, 1990, Ser. No. 465,764

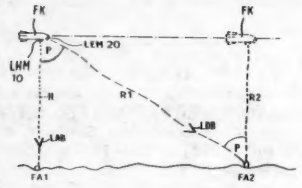
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1989, 3901040

Int. Cl.[5] G01S 17/87

U.S. Cl. 356—4 12 Claims

1. An apparatus for measuring distance and altitude for providing flight control signals to a cruise missile, comprising air-borne laser distance measuring means capable of downwardly looking for measuring altitude above ground and capa-

ble of obliquely and forwardly viewing for measuring distance at an oblique angle (ρ), said laser distance measuring means further comprising means for providing reception intensity signals and distance representing signals, central signal processing means connected to receive said intensity signals and said distance signals to perform a timed correlation in order to produce speed and altitude signals, said central signal processing means also comprising signal comparator means for comparing the intensities of said intensity signals derived from signals received from the same location or locations on the ground to form a correction signal which takes into account a back-scattering of laser radiation dependent on said oblique angle (ρ), said correction signal representing a signal extinction caused by fog on the ground, said central signal processing means also including computer means for calculating a corrected altitude value in response to said correction signal, said flight control signals including said corrected altitude value.



4,978,222

ANALYSIS OF PERIODIC MOTIONS USING MOIRé FRINGES

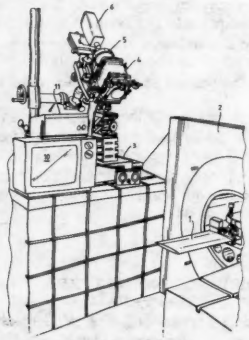
Walter Drew, Higham Ferres, and Clive R. Pyne, Sharnbrook, both of England, assignors to The Secretary of State for Defence, London, United Kingdom

Filed May 31, 1989, Ser. No. 358,801

Claims priority, application United Kingdom, Dec. 5, 1986, 8629160

Int. Cl.[5] G01B 11/16, 11/24

U.S. Cl. 356—374 9 Claims



1. A method for monitoring periodic motions in a body comprising:

providing a surface pattern upon the body in a manner such that the surface pattern moves with the body surface in conformity therewith, the surface pattern being an array of straight parallel lines;

providing a reference pattern which is an array of straight parallel lines;

causing the reference pattern and the surface pattern or an image thereof to be superimposed one upon the other at an interaction site on or off the body surface;

with the body at rest firstly adjusting the reference pattern so that at the interaction site it assumes a complementary position and complementary dimensions to the surface pattern then secondly skewing the reference pattern with respect to the surface pattern so that at the interaction site there is created a dense field of the mismatch fringes, characterised by providing a continuous real-time visual display of an image manifest at the interaction site with the body in motion, which image is a composite of the skewed reference pattern and the moving surface pattern, this image exhibiting a secondary fringe phenomena indicative of body displacement.

4,978,223

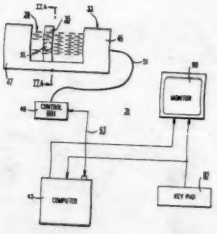
DETERMINATION OF DIMENSIONS OF TUBES

Kevin W. Kutchenriter, Latrobe, and Leo J. Moga, Jeannette, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 8, 1989, Ser. No. 320,735

Int. Cl.[5] G01B 11/06, 11/08

U.S. Cl. 356—384 13 Claims



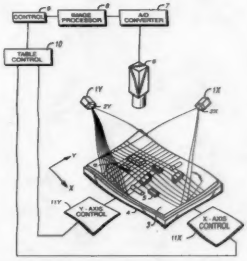
1. The method of determining the parameters for computing the outside diameter, the wall thickness, or the inside diameter of a tube, the said method including: producing a planar laser beam having a sharply defined end, positioning a mandrel in said laser beam with the transverse dimension of said mandrel intersecting the transverse dimension of said laser beam, determining as a first length, the distance along the transverse dimension of said laser beam from said sharply-defined end of said laser beam to the point of said mandrel nearest said sharply-defined end, mounting said tube on said mandrel in said laser beam with the inner wall of said tube in engagement with said mandrel at said nearest point and the transverse dimension of said tube intersecting said laser beam along the transverse dimension of said laser beam, thereby to produce a shadow of said tube, determining, as a second length, the distance from said sharply-defined end of said laser beam to the point of said tube nearest said sharply-defined end of said laser beam, and determining, as a third length, the distance along the shadow of said tube between the shadow of said point of said tube nearest said sharply-defined end of said beam and the shadow of the point of the shadow of said tube most remote from said sharply-defined end of said beam, whereby the outside diameter of said tube is equal to said third length and the wall thickness may be computed by subtracting the second length from the first length, and the inside diameter may be computed by subtracting twice the wall thickness from the outside diameter.

4,978,224

METHOD OF AND APPARATUS FOR INSPECTING MOUNTING OF CHIP COMPONENTS

Shin Kishimoto, Osaka; Toshihide Morimoto, Nara; Nobuaki Kakimori, Nara; Yuho Takahashi, Nara, and Morihide Ohsaki, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 12, 1988, Ser. No. 218,311
Claims priority, application Japan, Jul. 14, 1987, 62-175224; Jul. 14, 1987, 62-175225; Sep. 30, 1987, 62-246657; Dec. 18, 1987, 62-322086; Dec. 22, 1987, 62-326061
Int. Cl.[5] G01B 11/00
U.S. Cl. 356—394 10 Claims



1. An apparatus for inspecting components mounted on a circuit board comprising

light source means for causing a plurality of slit light beams to be made incident on a circuit board diagonally from above, said light source means including a first source unit for projecting slit light images in a first direction on said circuit board and a second source unit for projecting slit light images in a second direction on said circuit board, said first and second directions being different,

image receiving means for receiving said slit pattern images formed on said circuit board, and

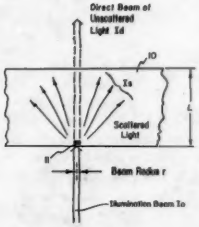
image processing means for generating data on positions of components mounted on said circuit board by receiving image signals from said image receiving means.

4,978,225

DETECTION OF ANOMALIES IN TRANSLUCENT MATERIAL BY CANDLING

Ernest M. Reimer, St. John's, Canada, assignor to Canpolar East Inc., St. John's, Canada

Filed Jul. 13, 1989, Ser. No. 379,183
Claims priority, application Canada, Jul. 19, 1988, 572411
Int. Cl.[5] G01N 21/59
U.S. Cl. 356—432 13 Claims



1. A candling method for inspecting translucent material for anomalies, comprising

(a) directing an illumination beam of light through said material while scanning said beam over a surface of the material, whereby to generate a correspondingly scanned transmitted beam of light emerging from another surface of the material, and

(b) observing said emerging beam while excluding light from the illumination beam that is scattered in the material, whereby to detect variations in the intensity of said emerging beam indicative of said anomalies,

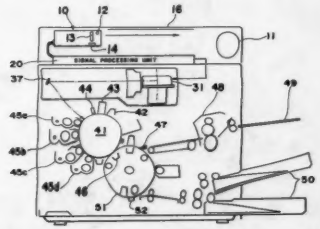
(c) wherein said beams have a radius no greater than 0.1 mm.

4,978,226

DIGITAL COLOR COPYING MACHINE FOR COMPOSING AND CONTROLLING THE COLOR OF A COMPOSED IMAGE

Shigeru Moriya, and Keiji Nakatani, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 10, 1989, Ser. No. 321,405
Claims priority, application Japan, Mar. 11, 1988, 63-59039; Mar. 11, 1988, 63-59040; Mar. 11, 1988, 63-59041; Mar. 11, 1988, 63-59042; Mar. 11, 1988, 63-59043; Mar. 11, 1988, 63-59044
Int. Cl.[5] H04N 1/40
U.S. Cl. 358—76 38 Claims



1. A digital color copying machine comprising:

image reading means for scanning an original document image and generating an image data signal corresponding to a primary color of the document image,

color compensating means for color compensating said image data signal generated by said image reading means,

image forming means for forming the original document image on a recording medium in response to the image data signal generated by said color compensating means,

mode indicating means for indicating a test mode,

area indicating means for indicating any area of the original document image,

memory means for storing the image data signal corresponding to the area indicated by said area indicating means transmitted from the image reading means,

test image signal generating means for reading out the image data signal stored in said memory means and applying it to said color compensating means a plurality of times and performing different color compensations on the indicated area by means of the color compensating means, thereby generating a test image signal when the test mode is set by said mode indicating means, and

control means for controlling said image forming means in response to the test image signal generated by said test image signal generating means to form a plurality of original document images of the indicated area subjected to the different color compensation respectively on the recording medium, thereby forming a test image.

4,978,227

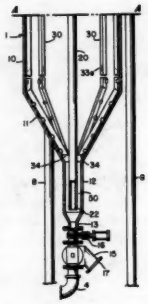
BLENDER FOR SOLID PARTICULATE MATERIAL

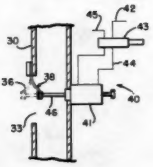
Kermit D. Paul, Bethlehem, Pa., assignor to Fuller Company, Bethlehem, Pa.

Filed Apr. 3, 1986, Ser. No. 848,005

Int. Cl.[5] B01F *13/02*

U.S. Cl. 366—101 14 Claims





9. In an apparatus for blending solid particulate material including a vertically oriented vessel having an upper part, a lower part, an inlet for material to be blended and an outlet for blended material and at least one generally vertical recycle channel associated with said vessel having at least one inlet communicating with the upper part of the vessel and an outlet, a flow control deflector operatively associated with said recycle channel inlet for controlling the flow of material into said recycle channel, the inlet of said recycle channel being a generally horizontal opening and said flow control deflector includes a baffle for partially closing said horizontal opening, the improvement comprising means for moving said baffle between a position where the baffle extends partially into the channel and a position where the baffle extends out of the channel.

4,978,228

MIXING BIN

Harald Wilms, Eriskirch, Fed. Rep. of Germany, assignor to Zeppelin-Metallwerke GmbH, Fed. Rep. of Germany

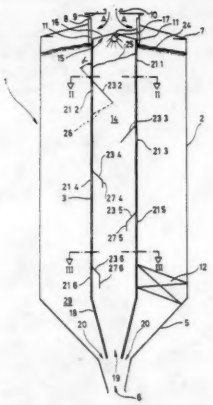
Filed Aug. 17, 1989, Ser. No. 394,925

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3829055

Int. Cl.[5] B01F *5/00, 5/24*

U.S. Cl. 366—138 20 Claims

1. A mixing bin for mixing bulk goods by gravity flow, comprising an outer container having a bottom provided with an outlet and a mixing pipe disposed substantially centrally in said outer container, said mixing pipe being provided with a plurality of intake ports disposed at different levels above said bottom for withdrawing bulk goods at said different levels from a bulk goods column contained in said outer container, all of said intake ports opening into a common interior space of said mixing pipe, said interior space having a cross-sectional area at each of said intake ports to be passed by the bulk goods within said interior space, a deflector baffle being disposed above each of said intake ports, projecting into said interior space and obturating a part of said cross-sectional area of said interior space, the parts of said cross-sectional area of said interior space obturated by respective ones of said deflector



baffles disposed at said different levels above said bottom being of different size, and the size of the obturated part of said cross-sectional area at each level above said bottom being selected such that a desired amount of bulk goods is withdrawn through the associated intake port.

4,978,229

METHOD AND APPARATUS FOR TESTING THERMAL CONDUCTIVITY

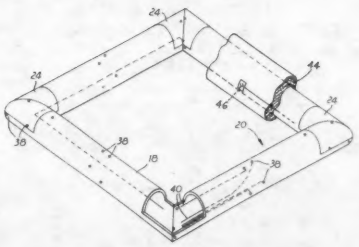
John T. Hughes, Worcester, United Kingdom, assignor to Zortech International Limited, Droitwich, United Kingdom

Filed May 25, 1989, Ser. No. 356,145

Claims priority, application United Kingdom, May 24, 1988, 881258

Int. Cl.[5] G01N *25/18*

U.S. Cl. 374—30 22 Claims



1. A method of testing the thermal conductivity of non-planar thermal insulating material, comprising:

surrounding a length of pipe with thermal insulating material extending along the pipe, said pipe being arranged as a closed loop, whereby a simulation is provided of actual conditions of use of insulation on insulated pipes;

establishing a temperature gradient between an interior region of said pipe and an exterior region of said insulating material;

measuring a temperature difference between inner and outer sides of said insulating material; and

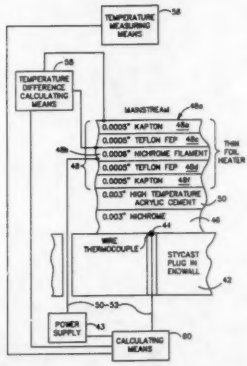
deriving an indication of thermal conductivity of said insulating material from said temperature difference.

4,978,230

APPARATUS AND METHOD FOR DETERMINING HEAT TRANSFER COEFFICIENT BASED ON TESTING ACTUAL HARDWARE RATHER THAN SIMPLISTIC SCALE MODELS OF SUCH HARDWARE

Eugene F. Adiutori, Westchester, and James E. Cahill, Neville, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Apr. 13, 1988, Ser. No. 181,128
Int. Cl.[5] G01N *25/00*
U.S. Cl. 374—43 **40 Claims**



28. An apparatus usable in a system for determining the heat transfer coefficient distribution on a predetermined surface of a turbine engine component, comprising:

an insert comprising a layer of low thermal conductivity material, a means for producing outputs used for calculating the heat transfer coefficient distribution on the surface of a component, said means for producing outputs comprising an array of temperature sensors next to the layer of low thermal conductivity material, and a means for producing a predetermined amount of heat flux comprising a heater covering the array of temperature sensors and the low thermal conductivity material, the insert to be located in an opening in the predetermined surface of the turbine engine component.

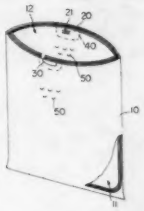
4,978,231

MULTIPLE DISPOSABLE PLASTIC BAG ASSEMBLY

Zhang A. Ling, No. 80, Yu Qun Rd. Wu Feng Xian, Taichung Xian, and Wang C. Han, No. 11, Lane 300, Tun Shen Rd., Taichung, both of Taiwan

Filed Feb. 24, 1989, Ser. No. 314,786
Int. Cl.[5] B65D *25/16*
U.S. Cl. 383—11 **4 Claims**

1. A multiple disposable plastic bag assembly including a bag body of two or more plastic bags nested one inside another, said bag body comprising a collection space and an opening; characterized in that two opposite connections are separately made on the top side edge of said opening to connect together all bags of said plastic bag assembly, a sticking element being respectively provided on the outermost bag of said plastic bag assembly at the location of each of said connections for sticking the top circular edge of said plastic bag assembly to the top circular edge of a wastebin, a perforated line being respectively made through all bags of the plastic bag assembly along the periphery of each of said two opposite connections from the top edge of said opening of said bag body to surround the associated connections thereinside, a plurality of fine air holes



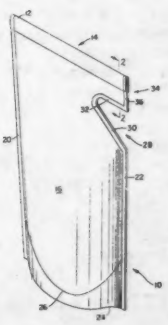
being made on a side surface at a middle portion of said bag body.

4,978,232

FLEXIBLE POUCH WITH FOLDED SPOUT

David P. Dunton, Mt. Clemens, Mich., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Filed Feb. 12, 1990, Ser. No. 478,883
Int. Cl.[5] B65D *33/38*
U.S. Cl. 383—33 **5 Claims**

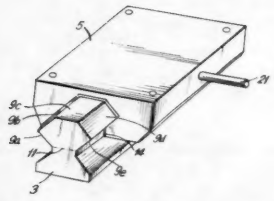


1. A flexible pouch comprising first and second opposed wall means of generally rectangular configuration formed from a single sheet of material bent upon itself to provide a fold assembly along its top edge and closed around its first and second side edges and bottom edge to define a chamber for storing a product, said wall means having wall portions forming spout means at one corner thereof defined by said top edge and said first side edge, seal means normally closing said spout means, said fold assembly including sections of said material folded upon themselves into a generally umbrella shaped configuration and normally maintained in a folded condition by said sealing means, said fold assembly providing a resilient spring force which opens said spout means upon removal of said seal means.

4,978,233
HYDROSTATIC BEARING ASSEMBLY

Gilbert Stötzel, Düsseldorf; Jörg Führmann, Weisendorf, and Joachim Schneider, Düsseldorf, all of Fed. Rep. of Germany, assignors to Ina Lineartechnik Ohg, Homburg/Saar, Fed. Rep. of Germany

Filed Sep. 18, 1989, Ser. No. 408,712
Int. Cl.[5] F16C *32/06*
U.S. Cl. 384—12 **22 Claims**

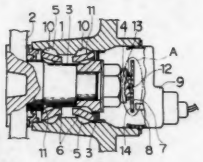


1. A hydrostatic bearing assembly for a slide, comprising:
at least one guiding rail (3) having a polygonal cross-section with a guiding portion having guiding faces (9*a–e*), and a fixing portion (7), said slide being movable along said guiding rail;
at least one carrying element (5) fixable to said slide (2);
a separate bearing element (6) arranged in said carrying element (5), said carrying element and said bearing element being formed so as to partially embrace said guiding rail as a single unit so that said bearing element faces the guiding faces of the guiding rail, said bearing element having at least one pressure pocket arranged so as to face at least one of the guiding faces of the at least one guiding rail; and
means for supplying a pressure agent to said at least one pressure pocket.

4,978,234
BEARING UNIT HAVING SENSOR

Hideo Ouchi, Sagamihara, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,691
Claims priority, application Japan, Jul. 28, 1988, 63-99109[U]
Int. Cl.[5] F16C *19/52*
U.S. Cl. 384—448 **1 Claim**

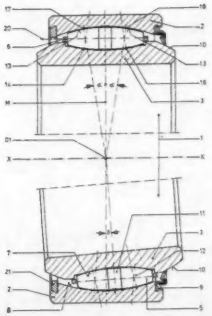


1. A bearing unit having a sensor comprising
(a) a non-rotating outer ring-like member forming an inner raceway track on an inner circumference thereof,
(b) a rotating inner ring-like member forming an outer raceway track on an outer circumference surface thereof,
(c) a rolling bearing having a plurality of rolling elements contacting said inner raceway track and said outer raceway track respectively,
(d) a concave portion or convex portion formed on an end surface center of a wheel shaft rotating with said inner ring-like member,
(e) a disklike sensor rotor forming on a center thereof a convex portion or concave portion which is fit to said concave portion or convex portion, and secured by welding to the end surface of said wheel shaft on condition that said concave portion and said convex portion are fit, and
(f) a sensor attached, opposing said sensor rotor, to a lid body covering an end portion opening of said outer ring-like member.

4,978,235
JOINT BEARING

Werner Jacob, Briandring 29, 6000 Frankfurt am Main 70, Fed. Rep. of Germany

Filed Feb. 13, 1990, Ser. No. 479,344
Claims priority, application Fed. Rep. of Germany, Feb. 15, 1989, 3904456
Int. Cl.[5] F16C *33/36*
U.S. Cl. 384—450 **6 Claims**



1. A joint bearing having an inner race and an outer race which may be articulated relative to each other, and rolling members guided by a cage and rollingly arranged at the inner race track and outer race track on a circular track, the inner race track and the outer race track having a cross-section with a circular arch shape, the race track having a center arranged on the axis of rotation of the bearing, the rolling members (5) comprising a central cylindrical portion (11), and carrying portions (12) which adjoin the central cylindrical portion (11) on either side, the central cylindrical portion (11) and the carrying portions (12) being rotation-symmetrical with reference to the rolling member axis (19), and being supported at the outer race track (8) and at the inner race track (7) so as to form four contact points (15, 16, 17, 18), the contact points (15, 16, 17, 18), with reference to a central plane (M) containing centers (O_1, O_2) of the inner race track (7) and the outer race track (8), being arranged so as to be offset at an angle (α) which is greater than a self-inhibition angle.

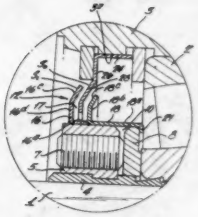
4,978,236
DEVICE FOR MOUNTING A BEARING ON A SHAFT MEMBER OR THE LIKE

Sture Östling, Katrineholm, Sweden, assignor to SKF Mekanprodukter AB, Katrineholm, Sweden

Filed Mar. 7, 1990, Ser. No. 489,512
Claims priority, application Sweden, Mar. 17, 1989, 8900952
Int. Cl.[5] F16C *33/80*
U.S. Cl. 384—480 **7 Claims**

1. A device for mounting a bearing (2) on a shaft (1) in a housing (3) comprising a clamping sleeve (4) provided between the bearing and the shaft, a flange (5) located at least on one side of the bearing, sealing means provided between the flange (5) and the housing (3) radially outwardly at the flange (5), and means (7) for displacement of the bearing (2) axially on the sleeve (4) during mounting and dismounting of the bearing,

wherein the width of a slot (10) appearing between the flange (5) and the bearing (2) or a washer (8) associated therewith is altered at the axial displacement of the bearing (2), characterized in that the sealing means comprises a first sealing element



(16) associated with the flange (5) or the washer (8) and a second sealing element (14) cooperating with the first sealing element (16) and being associated with the housing (3), fixedly connected therewith, said first sealing element (16) extending axially across said slot (10) thereby bridging said slot.

4,978,237

CAGE STRUCTURE OF ROLLER BEARING

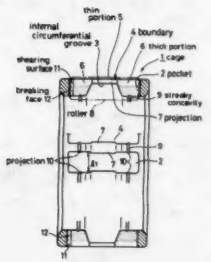
Nobutsuna Motohashi; Fukumitsu Kitauchi, and Nobuyuki Miyawaki, all of Osaka, Japan, assignors to Koyo Seiko Co., Japan

Filed May 16, 1989, Ser. No. 352,279

Claims priority, application Japan, May 16, 1988, 63-64741[U]

Int. Cl.[5] F16C *33/46, 33/54*

U.S. Cl. 384—580 **4 Claims**



1. A cage of a roller bearing including a plurality of pockets formed by punching from the outside in a circumferential direction of a barrel, each pocket storing a roller, comprising:

a first projection for preventing the roller from being disassembled to the outside of the barrel, said first projection being provided at a thin portion of said barrel which is positioned beside the brims of each pocket; and

a second projection for preventing the roller from being disassembled to the inside of said barrel, said second projection being provided at a thick portion of said barrel in an axial direction, by knurling.

4,978,238

PRINTING HEAD

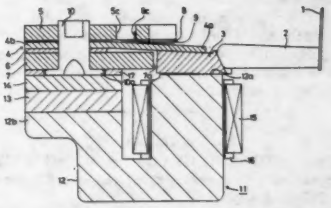
Hiroshi Sato, and Yoshiaki Miyauchi, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Dec. 7, 1989, Ser. No. 447,291

Claims priority, application Japan, Dec. 8, 1988, 63-310917

Int. Cl.[5] B41J *2/23*

U.S. Cl. 400—124 **13 Claims**



1. A printing head comprising:

a ring-like resilient plate having an outer base portion and a plurality of centripetally disposed resilient driving arms having printing elements operable to strike against a platen;

electromagnetic means comprising a permanent magnet and a coil for effecting actuation of said driving arms for movement between an advanced print position and a non-advanced position and in which said driving arms are held in said non-advanced position by said permanent magnet and are resiliently moved to said advanced print position upon operation of said coil which effects release of said driving arms from said permanent magnet;

a stopper plate means secured with said outer base portion of said resilient plate and having a radial inner portion juxtaposed to said driving arms on the advancing side of said driving arms; and

a ring-like stopper element in the form of a thin tabular member disposed between said radial inner portion of said stopper plate means and said driving arms for engaging and stopping the advancing movement of said driving arms substantially at the time that said printing wires strike said platen.

4,978,239

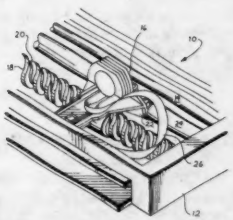
TEMPERATURE LIMITING APPARATUS AND METHOD FOR PRINTER

Randall W. Alexander, and Demetrios Troupes, both of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 4, 1984, Ser. No. 657,841

Int. Cl.[5] B41J *2/23*

U.S. Cl. 400—124 **9 Claims**



1. A printer of the type including a printhead for printing a sequence of symbols and means for limiting the operating

temperature of the printhead by adjusting the operation of the printhead when the temperature of the printhead exceeds a preset threshold, the improvement wherein the means for limiting the temperature includes:

means operative at a first time for storing a value representative of an assumed initial operating temperature of the printhead at that first time;

means responsive to the sequence of symbols printed by the printhead for periodically modifying said value based upon the symbols printed and the amount of time since the value was stored or modified; and

means responsive to the value when the value exceeds the preset threshold for limiting the operation of the printhead to prevent the overheating of the printhead, whereby the operating temperature of the printhead can be dynamically estimated and controlled.

4,978,240

INK RIBBON CARTRIDGE FOR PRINTING APPARATUS

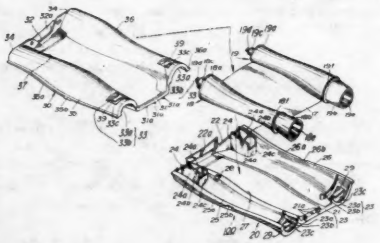
Hiroshi Katsuno, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 31, 1989, Ser. No. 401,231

Claims priority, application Japan, Sep. 9, 1988, 63-226187

Int. Cl.[5] B41J 33/52

U.S. Cl. 400—224.2 **14 Claims**



1. An ink ribbon cartridge for a printing apparatus comprising:

supply and take-up reels for winding an ink ribbon thereon, each of said reels including supported portions provided at both ends thereof;

a cartridge casing formed from at least two mating portions for accommodating said reels therein, said casing including means formed integrally on the inner wall thereof for rotatably supporting said supported portions of said reels;

an opening disposed on said casing for exposing a portion of the ink ribbon tightened between said reels;

means for continuously applying a constant frictional force to the outer diametrical peripheral surface of at least one end of both of said reels at the supported portions thereof so as to prevent unnecessary rotation of said reels; and

said applying means including a plurality of spring elements formed on at least one end of said casing in such a manner as to apply pressure to diametrically opposing areas on the outer peripheral surface of at least one end of both of said reels at the supported portions thereof.

4,978,241

ROOF GUTTER MAINTENANCE AND CLEANING APPARATUS

Tony Lawson, 566 Commerce, Gretna, La. 70056

Filed Apr. 2, 1990, Ser. No. 502,751

Int. Cl.[5] B08B 9/00; A47L 25/00

U.S. Cl. 401—118 **11 Claims**

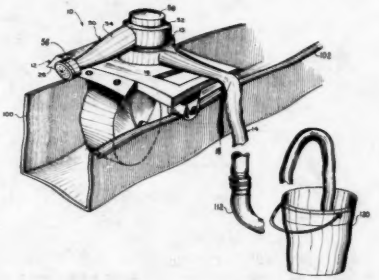
1. A roof gutter cleaning apparatus, comprising:

an elongated handle means;

a supporting plate means fixedly attached to one end of said elongated handle means, said supporting plate means having a top surface and a bottom surface;

a first supporting bracket means fixedly attached to the bottom surface of the supporting plate means and extending perpendicularly downwardly therefrom;

a first roller means rotationally supported by said first bracket means, said first roller means being adapted for supporting said cleaning apparatus while rolling along a bottom surface of a roof gutter;



a second supporting bracket means fixedly attached to the bottom surface of the supporting plate means, laterally spaced from said first bracket means and extending perpendicularly downwardly from the bottom surface of the supporting plate means; and

a second roller means rotationally supported by said second bracket means and adapted for stabilizing said cleaning apparatus while rolling along a top surface of a roof gutter lip.

4,978,242

BRUSH TIP OF LIQUID APPLICATOR AND METHOD FOR PRODUCING THE SAME

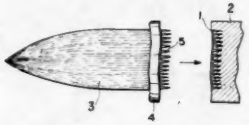
Yoshiomi Konose, Fujioka, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 19,393, Feb. 26, 1987, abandoned. This application May 9, 1989, Ser. No. 352,669

Claims priority, application Japan, Feb. 27, 1986, 61-43616

Int. Cl.[5] A46B 11/00

U.S. Cl. 401—129 **1 Claim**



1. A one-piece brush tip for a liquid applicator comprising:

a shaped bundle of synthetic resin fibers having a tip portion and a rear portion, said tip portion being shaped to a tapered point to apply liquid supplied to said resin fibers, said rear portion being shaped as a flange having a predetermined thickness and a diameter greater than a majority of said shaped bundle, and

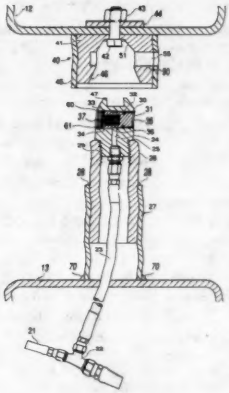
a plurality of spaced conical projections integrally provided on and protruding from said flange portion in a direction opposite to said tip portion, said projections being easily elastically deformable so as to allow a secure connection of said flange portion to the liquid applicator.

4,978,243

AUTOMATIC BOOM REST AND LATCH

David L. Hensler, Fort Wayne, Ind., assignor to Hydra Tech, Inc., Fort Wayne, Ind.

Filed Jan. 3, 1990, Ser. No. 460,352
Int. Cl.[5] F16D 1/00
U.S. Cl. 403—24 27 Claims



1. A boom latch system comprising:

a boom movable between a use position and a stowage position,

a power supply means for moving said boom,

a latch member receiving means,

a boom latch comprising

a latch body,

a latch member movable between an unlatched position and a latched position in which it is engagable with the latch member receiving means,

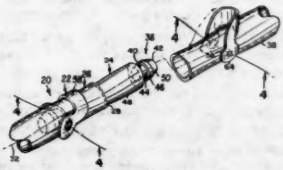
the latch member being operably connected to the power supply means to move the latch member between the unlatched and latched positions such that the boom may be latched in the stowage position.

4,978,244

FASTENER APPARATUS

Fredric A. Lange, Osseo, Minn., assignor to Interlock Structures International, Inc., Maple Grove, Minn.

Continuation-in-part of Ser. No. 162,984, Mar. 2, 1988, abandoned. This application Jul. 6, 1989, Ser. No. 376,964
Int. Cl.[5] F16D 1/00
U.S. Cl. 403—379 17 Claims



6. Connecting apparatus, comprising: a hollow cylindrical tube having a first wall and an open end, said first wall having a pair of openings aligned along a chord in a cross-sectional plane of said tube;

a cylindrical insert member having a second wall formed to slide into the open end of said hollow tube, said second wall having an annular slot with axially spaced second edges, portions of said first and second edges being aligned; and

a fastener member including a pair of protuberances and means for moving said protuberances generally along said chord line between an engagement position with said first and second edges and a disengageable position with said first and second edges.

4,978,245

FLUID CHARGED ROADWAY BARRIER

John M. White, 15774 Widewater Dr., Dumfries, Va. 22026

Filed Aug. 21, 1989, Ser. No. 396,336
Int. Cl.[5] E01F 13/00
U.S. Cl. 404—6 4 Claims

1. A roadway barrier comprising:

inverted U shaped shell means having forward and rearward portions, having inner and outer surfaces, and defining a space between said inner surfaces;

expandable bladder means for containing a fluid, said bladder means being secured to an inner surface of only one of either of said forward or rearward portions, said bladder means closely following said inner surface of said portion to which it is connected throughout the height of said inner surface and when said bladder is empty of fluid, said bladder resiliently collapsing against said inner surface; and

valve means for enabling charging and discharging of fluent material from within said bladder means, whereby

when fluent material is charged into said bladder, said bladder expands and substantially entirely fills said space between said forward and rearward portions of said shell means, and when said bladder is discharged, said bladder resiliently collapses within said shell to enable nested stacking of said shell means.

4,978,246

APPARATUS AND METHOD FOR CONTROLLING LASER GUIDED MACHINES

Philip J. Quenzi, Rte. 1, Box 56A, Atlantic Mine, Mich. 49905, and David W. Somero, Wheeler Rd., New Ipswich, N.H. 03071

Filed Jul. 18, 1989, Ser. No. 381,177
Int. Cl.[5] E01C 19/22, 23/01; G01C 9/06
U.S. Cl. 404—84 35 Claims

31. A guidance system for a laser guided screeding apparatus, said apparatus including a screed for spreading and/or smoothing loose or plastic material such as uncured concrete, and elevation means for raising and lowering said screed relative to a laser reference beam located externally of said apparatus, said system comprising:

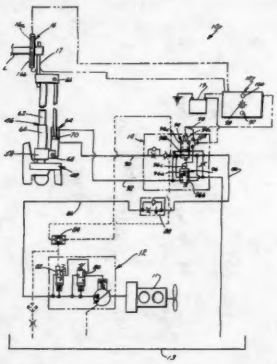
laser beam receiving means mounted on and movable with said screed for sensing the laser reference beam in a first, centered, on target region and in a second, off-center region of said receiving means;

electrical circuit means connected electrically to said laser beam receiving means for providing a first electrical condition when said screed and said laser beam receiving

means are in said first on target region and a second electrical condition when said screed and said laser beam receiving means are in said second region;

said elevation means adapted to raise and lower said screed and laser beam receiving means between said first on target region and said second off-center region; and

control means connected electrically to said electrical circuit means and mounted on said screed for continuously operating said elevation means to move said screed and laser beam receiving means between said first and second regions, said control means operating in response to said



electrical circuit means to move said screed and laser beam receiving means from said first on target region to said second off-center region when said electrical circuit means provides said first condition, and for operating said elevation means to move said screed and said laser beam receiving means from said second off-center region back to said first on target region when said electrical circuit means provides said second condition, whereby the machine element will continuously cycle between said on target and off-center regions while reducing the dead band of said system.

4,978,247

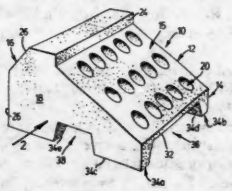
EROSION CONTROL DEVICE

Walter J. Lenson, 140 Millbank Drive, London, Ontario, N6C 4V7, Canada

Continuation-in-part of Ser. No. 859,720, May 5, 1986, abandoned. This application Feb. 27, 1987, Ser. No. 20,029

Int. Cl.[5] E02B *3/04*

U.S. Cl. 405—15 **11 Claims**



1. A modular breakwater device for placement on a beach floor of a body of water and near a shore thereof for alleviation of the effects of erosion, comprising:

a body portion having a first surface defining a seaward face and oppositely disposed therefrom a second surface defining a landward face;

a plurality of first passages extending between said first and second surfaces for the passage of water therethrough, said body having a continuous uninterrupted lower surface and a number of legs extending from said lower surface to space said lower surface from said beach floor to define a second passage, each of said legs having a pair of opposed upwardly diverging side surfaces whereby said legs provide a stable footing for said device by minimizing the effects of scour along said legs and, said diverging surfaces provide a progressively increasingly resistance to settling of said device into said beach floor.

2. A method of forming a breakwater along the shore of a body of water, comprising the steps of:

disposing a breakwater device on a beach floor, the breakwater device having a body portion with a first inclined surface defining a seaward face and oppositely disposed therefrom a second surface defining a landward face, with passages extending between said first and second surfaces, said breakwater device having a continuous uninterrupted lower surface; and

providing below said lower surface a number of legs which are spaced along the periphery thereof, each of said legs having a pair of opposed upwardly diverging side surfaces to space said lower surface from said beach floor to allow water subcurrents to flow beneath said lower surface and to provide a progressively increasing resistance to settling of said device into said beach floor.

4,978,248

ADVANCEABLE MINE ROOF SUPPORTS

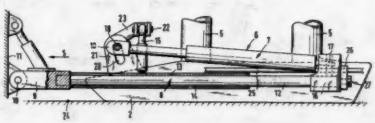
Gerhard Sprenger, Lünen, and Jürgen Dodt, Iserlohn, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, GmbH, Fed. Rep. of Germany

Filed Jul. 13, 1989, Ser. No. 379,476

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823682

Int. Cl.[5] E21D *23/08*

U.S. Cl. 405—292 **20 Claims**



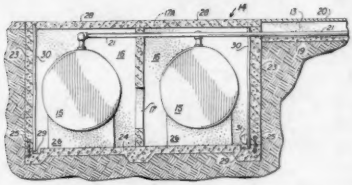
1. In an advanceable roof support comprising a floor engaging structure, a roof engaging structure, telescopic props disposed between the roof and floor engaging structures, the floor engaging structure being composed of a pair of laterally-spaced apart floor sills; shifting means at least partly between the sills, the shifting means being composed of an hydraulic ram and thrust means operably connected in an articulated manner to the floor sills and being adapted for connection in an articulated manner to an advance abutment, such as a conveyor, adjacent the support, means interconnecting the floor sills to permit relative vertical displacement therebetween, elongate guides on adjacent sides of the floor sills and a guide connected to the shifting means slidably engaged with the elongate guides whereby the ram can be operated to extend or retract to displace the support forwardly relative to the advance abutment or to displace the advance abutment away from the support in an advancing direction with the aid of the thrust means and the shifting means is guided by relative displacement between the guide and the guide rails; the improvement comprising the guide is connected to the shifting means by a pivot joint with an axis extending in the direction of advancement, and further comprising hydraulic piston and cylinder units coupled to the floor sills and resting on a supportive face of the thrust means, the units being used to partially lift the floor sills during the advancing displacement of the support.

4,978,249

SAFE, FLUID-STORAGE SYSTEM

Troy H. Killman, HC 75 Box 2825, Camp Verde, Ariz. 86322

Filed Mar. 14, 1989, Ser. No. 323,504
Int. Cl.[5] B65D 25/00
U.S. Cl. 405—303 8 Claims



1. In a fluid-storage system having a fluid storage tank subject to such deterioration and damage as to permit the escape from said tank of fluid stored therein, to the detriment of the environment; fluid distribution lines for conveying fluid to and from said storage tank; and pumping means to aid in the conveyance of said fluid through said distribution lines, the improvement comprising:

an underground structure of water tight construction housing said storage tank;

water tight access means coupled to said underground structure for providing access to said storage tank; and

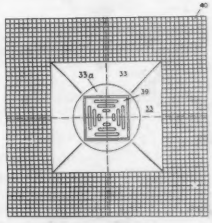
said water tight access means comprises both a convenient personnel access to the interior of said structure and said storage tank, and a lid for the ready, economical emplacement and replacement of said storage tank in said underground structure without excavation of said structure.

4,978,250

DISCHARGE FITTING FOR A TILED FLOOR

Johannes Dallmer, Arnsberg, Fed. Rep. of Germany, assignor to Firma Dallmer GmbH & Co., Arnsberg, Fed. Rep. of Germany

PCT No. PCT/EP88/00627, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO89/05889, PCT Pub. Date Jun. 29, 1989
PCT Filed Jul. 12, 1988, Ser. No. 399,463
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742549; Feb. 13, 1988, 3804596
Int. Cl.[5] E03F 5/04
U.S. Cl. 405—303 10 Claims



1. A discharge fitting for a tiled floor, comprising:

a sink provided with a headpiece which carries a grate;

a plate adapted for receiving said sink and including surfaces directed toward said sink; and

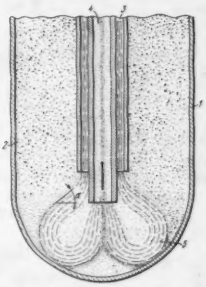
a lattice fixedly connected to said plate on all sides thereof for outwardly extending said surfaces of said plate all around, said lattice being placed on a floor so as to form a foundation for tiles to be subsequently attached by means of a suitable compound material, with said lattice being bound in the compound material in order to attain a tension-proof connection between said plate and the floor.

4,978,251

METHOD AND APPARATUS FOR CONVEYING MATERIALS IN BULK BY LIQUID PRESSURE

Valery P. Drobadenko, and Olga A. Lukonina, both of Moscow, U.S.S.R., assignors to Moskovsky Geologorazvedochny Institut Imeni Sergo Ordzhonikidze, Moscow, U.S.S.R.

Filed Jun. 8, 1989, Ser. No. 363,135
Claims priority, application U.S.S.R., Jun. 22, 1988, 4437962
Int. Cl.[5] B65G 53/24
U.S. Cl. 406—50 10 Claims



1. A method for conveying materials in bulk by liquid pressure, comprising the steps of:

loading a material in bulk into a chamber to fill it up;

supplying to the chamber liquid under pressure in the form of a downward annular flow for discharging the material in bulk from the chamber in an upward flow passing inside said downward annular flow of liquid and conveying the material in bulk by liquid pressure;

forming in the chamber a zone of recirculation flows of liquid supplied under pressure by swirling said downward annular liquid flow to an extent determined by a ratio of the rotational component of velocity to the axial component of velocity which is at least equal to 0.4;

carrying out said discharge of the material in bulk in said zone of recirculation flows of liquid supplied under pressure.

4,978,252

MATERIAL FEEDING APPARATUS USING PRESSURIZED AIR

Henry Sperber, 8 Red Fox La., Englewood, Colo. 80111

Filed Jun. 7, 1989, Ser. No. 362,874
Int. Cl.[5] B65G 53/40
U.S. Cl. 406—64 9 Claims

1. A feeding apparatus using pressurized air, comprising:

container means for containing material;

tine means disposed in said container means for engaging the material during its movement in said container means;

adjusting means for controlling the size of an inlet through which the material passes, said adjusting means including first and second inlet adjusting means, said second inlet adjusting means being located on a side of said container means opposite a side of said container means having said first inlet adjusting means, said first and second inlet adjusting means cooperating to define said inlet and cooperating to define a predetermined angle which remains substantially the same regardless of the size of said inlet;

feeder means for receiving material from said inlet and also

receiving pressurized air, wherein pressurized air is used to carry the material from said feeder means; and

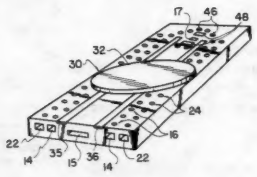
air passageway means provided adjacent to said adjusting means and spaced from said feeder means for permitting the venting of air from said container means.

4,978,253

AIR CUSHION CONVEYING DEVICE WITH MAGNETIC GUIDANCE

Jean-Pierre Lazzari, Corenc, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 2, 1989, Ser. No. 360,251
Claims priority, application France, Jun. 8, 1988, 88 07636
Int. Cl.[5] B65G *51/03*
U.S. Cl. 406—88 **7 Claims**



1. Air cushion conveying device with magnetic guidance incorporating a track, having an upper face, said track having air jet pipes issuing obliquely in a first longitudinal direction on its upper face, thus making it possible to longitudinally displace a part without contact with the track, this device comprises a circular disk, which can rotate and support said part, the track is provided with a first magnetic guidance device constituted by two parallel, magnetized strips inserted in the upper face of said track and the disk is provided on its face facing the track with a second magnetic device constituted by a magnetic sheet ring inserted in said disk and whose diameter is at least equal to the spacing between the parallel, magnetized strips.

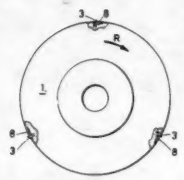
4,978,254

TOOL FOR MACHINING AND BEVELLING POLYCARBONATE OPHTHALMIC GLASSES LENSES USING A STANDARD GRINDING MACHINE

Jean-Pierre M. F. Langlois, Rouen, and Michel J. M. Lecerf, La Saussaye, both of France, assignors to Briot International, Elbeuf, France

Filed Jul. 31, 1989, Ser. No. 387,597
Claims priority, application France, Aug. 31, 1988, 88 11404
Int. Cl.[5] B26D *1/12*
U.S. Cl. 407—33 **10 Claims**

1. A tool for machining and bevelling polycarbonate ophthalmic glasses lenses, which tool is adapted to be mounted on a standard machine for grinding and bevelling ophthalmic glasses, characterized in that the tool comprises a metal body portion having a rim, said rim having a groove of V-shaped cross section and at least two teeth, each tooth being in the form of an inserted small plate having a correspondingly V-shaped notch but with the plate slightly protruding in said



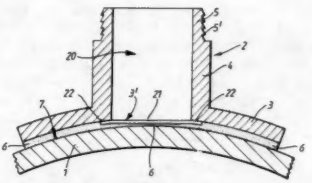
groove, a shallow recess being provided in said body rim (just) in front of and adjacent each tooth in the direction of rotation of the tool.

4,978,255

TAPPING FLUID SUPPLY PIPES

John C. Gale, Monkton Lea, Winterbourne Monkton, Swindon, Wiltshire, and Howard J. Lang, 12 Lytchett Way, Nythe, Swindon, Wiltshire, both of England

Filed Aug. 17, 1988, Ser. No. 233,043
Int. Cl.[5] B23B *41/08*
U.S. Cl. 408—1 R **9 Claims**



1. In a method of tapping a pipe of ferrous material whilst the pipe contents remain under pressure therein, which comprises: (1) adhering to the pipe a saddle member comprising a sole plate with a layer of adhesive for seating on the pipe surface, the plate having a circular aperture therein, and an annular wall member upstanding from the plate around the aperture and defining with the aperture a through bore;

(2) securing to the adhered saddle means for cutting and tapping the pipe; and

(3) cutting and tapping the pipe through the bore; the improvement which comprises using in step (1) a saddle which includes closure means with an adhesive layer contiguous with the layer of adhesive on the sole plate for closing said bore at least around the periphery thereof at the said aperture to prevent adhesive from entering the bore, and wherein in step (3) said closure means are removed by means for reopening the bore, said reopening means including at least one magnet to retain ferrous waste released during removal of said closure means.

4,978,256

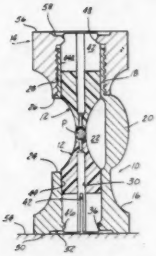
DRILL FIXTURE USEFUL FOR DRILLING HOLES IN BEAD LIKE OBJECTS

Robert Wellington, and Louis Bell, both of Albuquerque, N. Mex., assignors to Rio Grande-Albuquerque, Inc., Albuquerque, N. Mex.

Filed Apr. 23, 1990, Ser. No. 542,881
Int. Cl.[5] B23B *41/00, 49/02*
U.S. Cl. 408—72 R **8 Claims**

1. A drill fixture useful for drilling holes in bead like objects such as pearls, said fixture comprising a pair of like elongate drill guide bushings of a relatively firm resilient material, each

bushing having a concave bead receiving seat at one end thereof and a central drill guide bore extending longitudinally through the bushing from said bead seat to the other end of the bushing, mounting means for mounting said bushings with their drill guide bores in coaxial alignment with each other and the bead seats of the bushings in facing opposed relationship to each other and exposed within an access recess in said mounting means intermediate the opposite ends of said mounting



means, said mounting means having drill access openings in its opposite ends accommodating the insertion of a drill into a drill guide bore from either end of said mounting means, clamp means on said mounting means for moving one of said bushings longitudinally of said mounting means relative to the other of said bushings to clamp a bead like object between the bead seats of said bushings, and support means at each end of said mounting means for stably supporting said mounting means at either end upon a horizontal support surface.

4,978,257

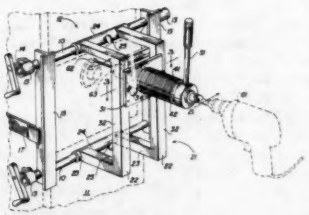
SAFE DRILLING RIG

William G. Nowman, P.O. Box 143, Tonopah, Ariz. 85354

Filed Dec. 19, 1984, Ser. No. 683,727

Int. Cl.[5] B23B *47/28*

U.S. Cl. 408—111 **1 Claim**



1. A drilling rig for boring holes in the door of a combination safe comprising:

(a) a clamping bracket assembly, including

(i) spaced drill-frame mounting bars, dimensioned to lie across the face of the door of said safe,

(ii) means for clamping said drill-frame mounting bars to said door face on opposite sides of the combination lock on said door;

(b) a drill frame, including

(i) a generally U-shaped support bracket, including a bottom member terminating in legs which extend toward and are carried on said spaced mount bars, and

(ii) bearing support means carried on said bottom member of said support bracket;

(c) a bearing assembly carried on said bearing support and positioned over the intended drilling location on the face of said safe door, including

(i) an elongate cylindrical outer barrel with screw threads formed in the outer surface thereof which engage mating internal threads formed in an aperture in said bearing support,

(ii) means for rotating said barrel to axially advance said barrel on said mating threads toward the face of said door,

(iii) an elongate drill shaft journaled for rotation in said barrel, and

(iv) thrust bearing means carried internally of said barrel for receiving thrust loads on said drill shaft and distributing said thrust loads to said barrel, drill frame and clamping bracket;

all drilling force exerted axially on said drill bit being exerted by rotation of said barrel in said bearing support.

4,978,258

CUTTING TOOL

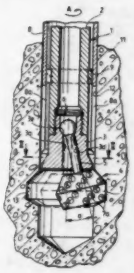
Reinhard Lins, Sevelen, Switzerland, assignor to Hilti Aktiengesellschaft

Filed Apr. 12, 1990, Ser. No. 508,936

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1989, 3912248

Int. Cl.[5] B23B *51/00*

U.S. Cl. 408—187 **9 Claims**



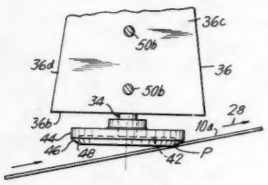
1. Cutting tool for forming an undercut in a borehole drilled in a component of a hard material structure such as masonry, concrete and similar materials, comprising an axially elongated tubular drive shaft (1) having a first end and a second end, and a cutting member (4) mounted in and projecting outwardly from the first end of said drive shaft, said cutting member (4) comprises an axially extending shank section located within said drive shaft and having a first end and a second end, the first end of said shank section (5) projects outwardly from the first end of said drive shaft, and a cutting head (7) fixed to the first end of said shank section, said cutting head (7) having an outer surface with cutting members (7*a*) secured in the outer surface, wherein the improvement comprises means on said drive shaft and shank section for forming a ball joint at the second end of said shank section for pivotally supporting said cutting member, a central bore (3*a*) in said drive shaft located at said pivotal supporting means and having an axis co-axial with the axis of said drive shaft, a guidance bore in said drive shaft extending from said central bore to the first end of said drive shaft with said guidance bore changing from the central bore to a bore elongated transversely of the axial direction thereof at the first end of said drive shaft, and said guidance bore having guidance stop faces (3c) extending chordally of the axis of said drive shaft for guiding the pivotal movement of said cutting member in said guidance bore.

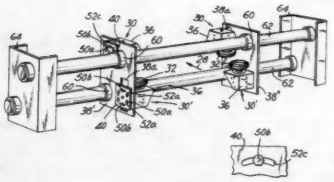
4,978,259

APPARATUS AND METHOD FOR DEBURRING METAL STRIP

Carl A. Wollam, Cortland, Ohio, assignor to Alcan International Limited, Montreal, Canada

Filed May 4, 1988, Ser. No. 190,478
Int. Cl.[5] B23C 3/12
U.S. Cl. 409—132 5 Claims





1. A method of removing burr from a longitudinal edge of a metal strip advancing continuously along a defined path, comprising

(a) engaging said strip edge with an inwardly facing annular cutting edge of a rotary knife while

(b) supporting the knife adjacent said path for rotation of the cutting edge about an axis disposed laterally outwardly of the path and in a plane of rotation obliquely intersecting said path such that the cutting edge engages the strip edge at a location beyond said axis in the direction of strip advance and the knife is rotated by the engagement of its cutting edge with the advancing strip edge at that location,

(c) said knife cutting burr from the strip as it engages the strip edge at said location.

2. Apparatus for deburring metal strip, comprising, in combination with means for advancing a metal strip continuously along a defined path,

(a) a rotary knife element having an inwardly facing annular cutting edge for cutting burr from an edge of a metal strip, and

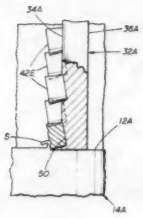
(b) means for freely rotatably mounting the knife element adjacent the path in a position for partially overlying an edge portion of a metal strip advancing in the path, with the cutting edge positioned for rotation about an axis disposed laterally outwardly of the path and in a plane of rotation intersecting the path obliquely such that the cutting edge engages a burr-bearing edge of an advancing metal strip in the path at a location beyond said axis in the direction of strip advance and said knife element is rotatably driven by the engagement of the cutting edge with the advancing strip edge in a direction for carrying burr, cut from the strip, outwardly away from the strip path.

4,978,260

CUTTING TOOL FOR REMOVING MATERIALS FROM WELL BORE

Gerald D. Lynde, and Harold H. Harvey, Jr., both of Bossier City, La., assignors to Tri-State Oil Tools, Inc., Bossier City, La.

Continuation-in-part of Ser. No. 816,287, Jan. 6, 1986, Pat. No. 4,796,709. This application Apr. 15, 1988, Ser. No. 181,812
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.
Int. Cl.[5] E21B 29/00
U.S. Cl. 166—55.6 29 Claims



1. In a cutting tool adapted to be positioned downhole in a well bore for removing members from the well bore;

a tool body adapted to be received within said well bore and to be supported at its upper end for rotation about a longitudinal axis;

a plurality of blades at spaced intervals on the body and extending outwardly therefrom, each of the blades having a base with a leading surface relative to the direction of rotation;

a plurality of closely spaced cutting elements of hard cutting material secured to said leading surface of the base each being of a predetermined size and shape and arranged in a predetermined generally symmetrical pattern on the base relative to the other elements, each of said cutting elements having an exposed front cutting face forming a cutting surface, a rear face secured to the leading surface of said base, a peripheral surface extending between said faces and a relatively sharp edge formed at the juncture of the front face and peripheral surface, the front face of each cutting element having a surface irregularity therein for directing a turning from the member being cut to effect a breaking of the turning;

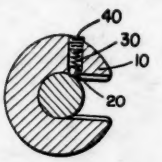
said cutting elements being arranged in transversely extending rows on each blade, the cutting elements on corresponding transversely extending rows on adjacent blades being offset whereby the concentric cutting paths of the cutting elements on adjacent blades are offset.

4,978,261

QUILL STOP

Charles O. Wright, III, 6 Shannon Ct., Oxford, Conn. 06483

Filed Dec. 8, 1989, Ser. No. 447,945
Int. Cl.[5] B23Q 21/00; F16B 37/08
U.S. Cl. 409—218 7 Claims



1. An improved quill stop device comprising:

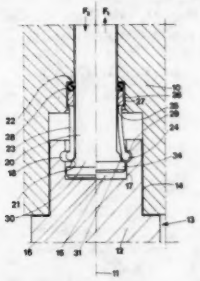
a. a round piece having a U shaped opening having parallel sides and a semi-circular connecting area;
b. longitudinal helical threads formed along said U shaped opening including said sides of said round piece; and
c. means extending into said opening along a said side for attaching said round piece to an externally threaded shaft of a quill of a Bridgeport type milling machine.

4,978,262

TOOL COUPLING BETWEEN A TOOLHOLDER AND A MACHINE SPINDLE

Eric Tjernström, Gävle, Sweden, assignor to Sandvik AB, Sandviken, Sweden

Filed Mar. 6, 1990, Ser. No. 488,996
Claims priority, application Sweden, Mar. 8, 1989, 8900808
Int. Cl.[5] B23B *5/26*
U.S. Cl. 409—233 **21 Claims**



1. A tool clamping device for clamping a toolholder to a machine spindle, said machine spindle including a cavity into which a shaft portion of a toolholder is to be inserted, said clamping device comprising:

a draw bar axially displaceable in said cavity and including a radially extending shoulder portion at an axially forward end thereof, said shoulder portion including an inclined cam surface and a locking surface disposed axially forwardly of and extending radially outwardly of said cam surface, and

a clamping sleeve extending around said draw bar such that said draw bar is axially reciprocal relative to said sleeve, a forward end of said sleeve including radially outwardly projecting locking flange means movable between a radially inward position permitting entry of a toolholder shaft into said cavity and a radially outward position in which said locking flange means enters a recess of the toolholder shaft,

said draw bar being movable axially rearwardly relative to both said cavity and said locking sleeve such that said cam surface cams said forward end of said locking sleeve from said radially inward position to said radially outward position and thereafter said locking surface abuts said forward end to lock said forward end in said radially outward position.

4,978,263

SLOT FORMING APPARATUS

Peter H. Sheppard, P.O. Box 459, Hanover, Pa. 17331-0459

Filed Jun. 2, 1989, Ser. No. 360,599
Int. Cl.[5] B23D *5/00*
U.S. Cl. 409—307 **10 Claims**

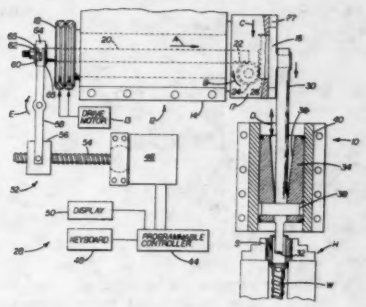
1. An apparatus for cutting a slot in a workpiece, comprising:

an adjustable throw crank;

means for varying the throw of said crank;

a connecting rod in operative engagement with said crank, said connecting rod including a tool mounted on the distal end opposite said crank; and

drive means in operative engagement with said connecting



rod through said crank for imparting a reciprocating/oscillating motion to said tool,

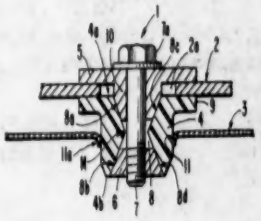
whereby an elliptically shaped slot is formed in said workpiece.

4,978,264

SECURING DEVICE FOR SECURING A MEMBER TO A SUPPORT PLATE AND HAVING AN EXPANDABLE BOSS

Eric Philippe, St. Germain en Laye, France, assignor to Valeo Vision, Cedex, France

Filed Sep. 25, 1989, Ser. No. 412,324
Claims priority, application France, Sep. 23, 1988, 88 12435
Int. Cl.[5] F16B *13/04*
U.S. Cl. 411—26 **10 Claims**



1. A securing device for securing a member to a support plate, said securing device comprising:

means for holding the member to be secured; and

means for adjustably fixing the member to the support such that a space between the member and the support can be adjusted;

wherein said means for adjustably fixing comprises a resiliently deformable expandable boss having an axial hole therethrough, a bolt extending into said axial hole and an expander nut threaded onto said bolt for engagement and expansion of said resiliently deformable expandable boss, whereby said expandable boss can be axially adjustably positioned in an aperture of the support; and

said means for holding comprises a head ring on said bolt and a shoulder on said resiliently deformable expandable boss for receiving and holding the member therebetween;

wherein said axial hole in said expandable boss tapers inwardly at both ends thereof, whereby said expander nut may engage said axial hole at a first said inwardly tapering end thereof to expand said expandable boss.

4,978,265

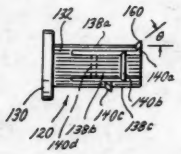
SLEEVE ANCHOR FOR SCREW

Thomas E. De Wan, 5945 Carrier St., St. Petersburg, Fla. 33714

Filed Jun. 28, 1989, Ser. No. 372,652

Int. Cl.[5] F16B *13/06, 37/04*

U.S. Cl. 411—60 **20 Claims**



1. An anchor for insertion in a hole through a wall, said wall having inner and outer surfaces with the hole extending inwardly through the wall from the outer surface of the wall to the inner surface of the wall, said anchor comprising a body having a passage therethrough into which a fastener, such as a screw, is adapted to be inserted, said passage having a central longitudinal axis, a plurality of resiliently flexible legs extending axially of the body and terminating in free ends movable generally radially inward and outward relative to the central axis, and a single holder on each leg projecting laterally outwardly from the leg, said holders being spaced at intervals axially of the body for accommodating walls of different thicknesses, said legs being adapted to resiliently flex generally radially inwardly as the body is inserted in the hole to a point where at least one of said holders exits the hole on the inner surface of the wall, the leg of said one holder thereafter being adapted to flex generally radially outwardly to a position wherein the holder extends beyond the hole and overlaps the inner surface of the wall to resist pulling of the body back through the hole.

4,978,266

FASTENING ELEMENT WITH EXPANDING SLEEVE

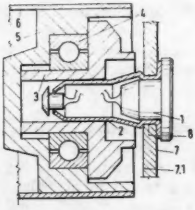
Klaus Becker, and Rüdiger Ostholt, both of Wetter, Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Apr. 20, 1989, Ser. No. 340,991

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813892

Int. Cl.[5] F16B *13/06*

U.S. Cl. 411—61 **18 Claims**



1. A shear-resistant fastener which is insertable into the hole of a member to which is attachable comprising:

an expandable sleeve having, at one end, a radial channel portion, the open edges of which each have a diameter larger than the hole into which it is to be inserted and an axial dimension which is substantially equal to the thickness of the member to which it is attachable;

a mandrel having a head for being in contact with one edge of the radial portion of the sleeve, said mandrel for expanding the sleeve;

said mandrel comprising;

a sleeve expansion member, depending from said head for contacting an axial portion of the radial channel portion; and

a cone member, the base of the cone being affixed to and axially aligned with the sleeve expansion member; said cone member comprising a truncated cone;

wherein the mandrel has, leading from its truncated cone, a resilient filamentous connecting element contacting that part of the sleeve which is remote from the radial channel;

said resilient filamentous connecting element having a filamentous portion comprising a thread member.

4,978,267

DEVICE FOR CASING INNER BOOKS IN BOOK COVERS

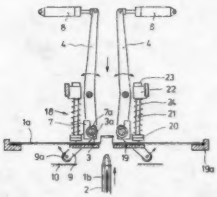
Helmut Kolkhorst, Rahden, Fed. Rep. of Germany, assignor to Kolbus GmbH KG, Rahden, Fed. Rep. of Germany

Filed Dec. 21, 1989, Ser. No. 454,816

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 88160335[U]

Int. Cl.[5] B42C *11/04*

U.S. Cl. 412—21 **3 Claims**



1. Device for casing inner books in book covers, including an inner book conveyor, and a casing-in device for moving the inner books along a plane of travel which rises synchronously with the inner book conveyor, comprising a feed roll system to enclose the inner book in the book cover said system includes a pair of clamps for accommodating and locating the spine of the book cover said pair of clamps includes a pair of complementary alignment elements which are moved by means of actuating devices from lateral positions toward the plane of travel of the inner book, thereby centering the spine of the book cover relative to the plane of travel of the inner book and aligning it at right angles thereto, and including hold-down elements operatively mounted in said device for holding the book covers against a support surface during centering and alignment.

4,978,268

COLLECTION VEHICLE, HOIST FOR THE VEHICLE AND METHOD OF TIPPING A BIN

Hugh Winwood, Kidderminster, and Peter Green, Catshill, both of United Kingdom, assignors to Waste Hoists Limited, United Kingdom

Filed Jun. 5, 1989, Ser. No. 361,187

Int. Cl.[5] B65G *67/04*

U.S. Cl. 414—409 **7 Claims**

1. A hoist suitable for mounting on a collection vehicle for raising a bin from the ground and tipping contents of the bin into a body of the vehicle, wherein the hoist includes:

a carriage;

a guide means for guiding the carriage for reciprocation along a rectilinear path relative to the vehicle body;

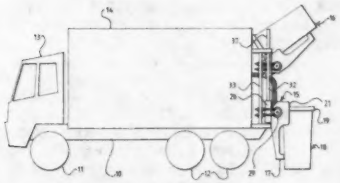
a motor for moving the carriage along said path;

a carrier for a bin, the carrier being mounted for tipping relative to the carriage about a tipping axis;

a cam;

a follower, one mounted for movement with the carriage along said path and the other mounted in a fixed position relative to the body of the vehicle for tipping the carrier relative to the carriage when the carriage is reciprocated relative to the body of the vehicle;

retaining means for retaining a bin on the carrier; and



operating means for applying the retaining means to and withdrawing the retaining means from the bin, when on the carrier, wherein the operating means includes a second cam and follower having elements, one element mounted on the carrier and one element mounted on the carriage and wherein said elements cooperate when the carrier is pivoted relative to the carriage.

4,978,269

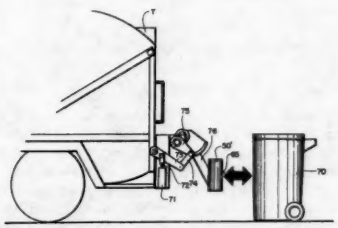
VACUUM CONTROLLED LIFTING APPARATUS

Kurt W. Niederer, Charlotte, N.C., assignor to Toter, Inc., Statesville, N.C.

Filed Mar. 2, 1989, Ser. No. 318,135

Int. Cl.[5] B66C *1/02*

U.S. Cl. 414—421 **15 Claims**



1. A vacuum-controlled vertical lifting apparatus for lifting a load, and comprising:

(a) primary vacuum means for initially engaging said load, said primary vacuum means comprising a vacuum head for exerting a vacuum-induced suction grip on the load, said vacuum head including a first resilient vacuum pad defining a first load-contacting surface, the load-contacting surface of said first resilient vacuum pad having a first outwardly-extending load-engaging flange for first engaging the load as the lifting apparatus and load are moved together;

(b) secondary vacuum means carried by said vacuum head for secondarily engaging said load and supplementing the vacuum-induced grip on the load, said secondary vacuum means comprising a second resilient vacuum pad positioned within the periphery of said first resilient vacuum pad and defining a second load-contacting surface, the load-contacting surface of said secondary vacuum means including a second outwardly-extending load-engaging flange of a length for engaging the load before engagement between the load and said first vacuum pad, said first and second flanges having walls of decreasing thickness towards said free end; and

(c) lifting means for effecting vertical movement of said load.

4,978,270

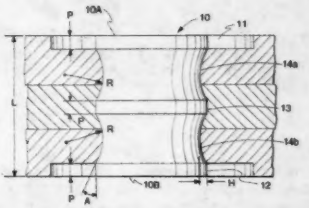
HEADLESS RIVET

George Ackerman, Twin Lakes, Wis., assignor to AKH, Inc., McHenry, Ill.

Continuation-in-part of Ser. No. 79,953, Jul. 31, 1987, abandoned. This application Jul. 7, 1989, Ser. No. 376,808

Int. Cl.[5] F16B *19/06, 21/00*

U.S. Cl. 411—511 **8 Claims**



1. A headless rivet comprising:

(a) a rivet of a length L which is substantially equal to the sum of the thicknesses of the materials to be fastened together and having flat ends of substantially the same size and shape,

(b) shank portions respectively formed adjacent said flat ends,

(c) a shoulder interposed between said shank portions, and

(d) curved neck portions extending from said shoulder to said shank portions, said curved neck portions having a predetermined radius R and depth of concavity H determined according to the following formula:

$$H = 10\% \ (L - 3P/2), \text{ and}$$

$$R = \frac{(L - 3P/2)^2 + 4H^2}{8H},$$

where:

L=length of rivet to be used, as determined by the combined thickness of materials being joined, and

P=thickness of said shoulder and of said shank portions.

4,978,271

RECYCLEABLE MATERIAL HANDLING APPARATUS

Jack G. Seader, Longmont, Colo., assignor to Western Disposal, Inc., Boulder, Colo.

Filed Jul. 6, 1989, Ser. No. 376,252

Int. Cl.[5] B60P *1/28*

U.S. Cl. 414—487 **7 Claims**

1. Apparatus for use in handling recycleable material, comprising

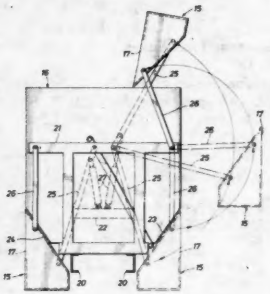
a vehicle having an elongate base,

a first container supported on the base and having an opening in the outer side thereof through which such material may be loaded at a place of collection,

a second and larger container supported on the base and having an opening in its top into which material from the first container may be loaded and a bottom portion which is disposed above a top portion of the first container and an outer side above the outer side of the first container, when the containers are in their loading positions,

means for moving the first container outwardly, upwardly and inwardly as well as outwardly, downwardly and inwardly past the outer side of the second container be-

tween a loading position in which its side opening is disposed on a side of the vehicle and an unloading position in which it is tilted to arrange its side opening for dumping the material loaded therein into the top opening of the second container, and



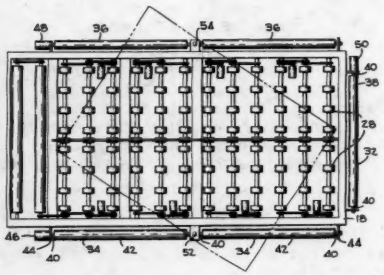
means for moving the second container upwardly and outwardly and inwardly and outwardly between a loading position in which its top opening is at the top of the vehicle and an unloading position in which its top opening is arranged for dumping material therein onto a place of disposal to one side of the base.

4,978,272

LOADER DECK COUNTER-ROTATING SIDE GUIDE ROLLERS

Michael A. Leon, Orlando, Fla., assignor to FMC Corporation, Chicago, Ill.

Filed Jul. 12, 1989, Ser. No. 378,722
Int. Cl.[5] B65G *39/12*
U.S. Cl. 414—529 **11 Claims**



1. In an aircraft loader having a powered deck structure including a frame supporting a plurality of selectively driven rollers rotatable about axes for allowing the shifting of a container on the deck surface, the improvement comprising:

a first set of one or more than one elongated rollers mounted on said frame structure outboard from said plurality of rollers and being rotatable about axes in a plane orthogonal to the axes of the selectively driven rollers;

a second set of one or more than one elongated rollers mounted on said frame structure outboard from said plurality of rollers and being rotatable about axes in a plane orthogonal to the axes of the selectively driven rollers;

a second set of one or more than one elongated rollers mounted on said frame structure outboard from said plurality of rollers and on the side of said frame structure opposite said first set of elongated rollers and being rotatable about axes in a plane orthogonal to the axes of the selectively driven rollers;

a single elongated roller mounted on said frame structure outboard from said plurality of rollers on the side of said frame structure between said first and second sets of elongated rollers being rotatable about an axis in a plane parallel to the axes of the selectively driven rollers:

independent means for driving each set of elongated rollers and said single elongated roller;

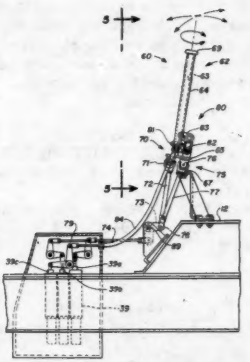
control means for directing the actuation of said plurality of rollers and said first set, second set and single elongated rollers.

4,978,273

LOADER BUCKET CONTROL

Daniel D. Radke, Antwerp, Belgium; Robert M. Pabodie, Jr., Morrow, Ohio, and Garry L. Ball, Lancaster, Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Nov. 22, 1989, Ser. No. 440,939
Int. Cl.[5] E02F *3/00*; G05G *9/04*
U.S. Cl. 414—697 **5 Claims**



1. In a loader having a prime mover including a wheeled frame; a loader mechanism pivotally supported from said frame for generally vertical movement relative thereof, said loader mechanism including a pair of transversely spaced loader arms pivotally attached to said frame at one end thereof for movement thereof about a generally horizontal axis and a loader bucket pivotally attached to the distal end of said loader arms, said loader bucket being articulated for movement bout a transversely extending axis between an open position and a closed position; a power means operably associated with said loader mechanism to effect movement thereof, said power means including a first linear actuator interconnecting said loader arms and said frame to effect said generally vertical movement of said loader arms, a second linear actuator interconnecting said loader arms and said loader bucket to control the pivotal movement of said loader bucket relative to said loader arms, and a third linear actuator mounted on said loader bucket to control the articulated movement thereof; and control mechanism operably associated with said power means to control the operation of said linear actuators, an improved control mechanism comprising:

a control lever operably connected to said power means and being movable in a longitudinal direction to control one of said linear actuators, in a transverse direction to control a second of said linear actuators, and in a rotational direction to control the third of said linear actuators, and

wherein said rotational direction relates to the axis of said control lever perpendicular to both said longitudinal and transverse directions, and

wherein said control lever includes a first elongated member

operably connected to a first linkage means operable to translate movement thereof in both said longitudinal and transverse directions for operable control of said first and second linear actuators, said control lever further including an elongated tubular member rotatably mounted on said first elongated member for rotation about the elongated axis of said first elongated member, said elongated tubular member being connected to a second linkage means to translate said rotational movement for operable control of said third linear actuator, and

wherein said first linkage means includes a plate affixed to said first elongated member, said plate being supported from said frame by a universal joint permitting pivotal movement of said plate in a longitudinal direction and in a transverse direction in response to the movement of said control lever in said longitudinal and transverse directions without permitting rotation of said plate.

4,978,274

MANIPULATOR

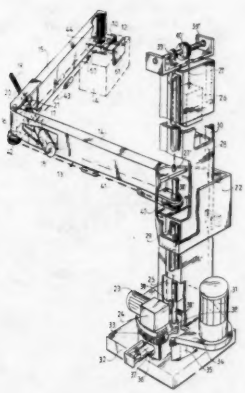
Rob de Groot, Laag-Zuthem, Netherlands, assignor to R. de Groot Holding Laag-Zuthem B.V., Zwolle, Netherlands

Continuation of Ser. No. 907,311, Sep. 15, 1986, abandoned. This application Sep. 8, 1988, Ser. No. 243,162

Claims priority, application Netherlands, Sep. 16, 1985, 8502525

Int. Cl.[5] B25J *9/06*

U.S. Cl. 414—744.3 **6 Claims**



1. A robotic-type manipulator which can pick up an object at one location and release the object at another location, said manipulator comprising

a base assembly which includes an upstanding sleeve having a pinion therearound which defines an axis,

a support assembly movably mounted on said base assembly, said support assembly including a support plate positioned above said upstanding sleeve and a vertical beam mounted on said support plate,

a first motor means which is mounted on said support plate and is engaged with said pinion to rotate said support assembly around said upstanding sleeve,

a carriage which is movable along said vertical beam,

a second motor means mounted on said support plate and connected to said carriage to move said carriage along said vertical beam,

a vertical shaft positioned within said vertical beam so as to be coaxial with said axis of said pinion and to define a first pivot axis,

a drive means for rotating said vertical shaft about said first vertical pivot axis,

an arm assembly which includes a first horizontal arm which has a first end and a second end, said first end being fixedly connected to said carriage and said second end defining a second vertical pivot axis; a second horizontal arm which has a first end and a second end, said first end of said second arm being pivotally connected to said second end of said first arm and said second end of said second arm defining a third vertical pivot axis, and a pickup/release means mounted on said third pivot axis,

third motor means for rotating said second arm about said second pivot axis relative to said first arm,

endless drive means extending from said first pivot axis to said second pivot axis and from said second pivot axis to said third pivot axis for rotation about said first, second and third pivot axes in unison and so that rotation of said vertical shaft will cause rotation of said pickup/release means without imparting motion to said first or second arms, and

control means connected to said first, second and third motor means for independently controlling their operation so that a compound path of movement created by said support assembly rotating about said base assembly, said carriage moving along said vertical beam and said second arm rotating relative to said first arm will occur and then stop, said control means including a first programmed memory for actuating the first drive motor during that time period required to operate the first drive motor during its contribution to the compound path of movement, a second programmed memory for actuating the second drive motor during that time period required to operate the second drive motor during its contribution to the compound path of movement, a third programmed memory for actuating the third drive motor during that time period required to operate the third drive motor during its contribution to the compound path of movement, and means for programming each of said first, second and third memories with a programmed number of counting signals prior to initial movement of the associated drive motor, the first, second and third drive motors each including counter means responsive to its independent contribution to the compound path of movement for respectively depleting the number of counting signals programmed into its respective memory and wherein the counter means vary the speed of each associated drive motor so that each associated drive motor is slowed, before being stopped, during the terminal portion of its motion in moving between pickup and release positions.

4,978,275

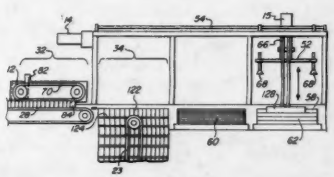
COMPUTER CONTROLLED ARTICLE HANDLING DEVICE

Laurie M. Reid, Casselberry, and Gary D. Hunt, Longwood, both of Fla., assignors to Simplimatic Engineering Company, Lynchburg, Va.

Filed Jul. 31, 1989, Ser. No. 387,692

Int. Cl.[5] B65G *57/14*

U.S. Cl. 414—789.5 **13 Claims**



1. An article handling device for receiving groups of articles in a first area and transferring said groups in succession onto a second area on a load bearing member in a vertically stacked format, said device comprising;

(a) means for sweeping successive groups of articles from said first area to said second area for stacking said groups one on top of the other onto said member mounted on a hoist and a servo-controlled motor for operating said sweeping means, said sweeping means including at least a pair of article engaging means for controlling movement of said groups from said first to said second area, a first one of said article engaging means for restraining movement of each said group from said first to said second area by engaging a leading edge of said group, and the second of said article engaging means for engaging a trailing edge of each said group and propelling said group from said first to said second area, both said article engaging means being mounted for travel on a support means around an endless path having one path portion aligned with said first area and a remaining path portion positioned away from said first area;

(b) means for transporting separator sheets from a supply thereof to said second area for interleaving at least one sheet between said successive groups;

(c) means for operating said hoist to index said hoist downward by a distance corresponding to the height of each group after each said group has been stacked on said member;

(d) an endless conveyor surface corresponding to said first area for continuously urging said groups along a conveyor path from said first area towards said second area, said conveyor surface moving at a speed SM, and wherein said first and second article engaging means extend into said conveyor path;

(e) a programmable means for controlling the operation of said servocontolled motor between at least two different nonzero speeds to stack said groups in accordance with a following predetermined protocol

(i) move said support means at a speed S1 about equal to speed SM to move said first article engaging means out of said conveyor path and out of engagement with said group to thereby release said group for propulsion by said conveyor surface from said first to said second area, and

(ii) after step (i), move said support means to move said second article engaging means further around said endless path into engagement with said trailing edge;

(iii) after said engagement, accelerate said support means to speed S2 greater than S1 to propel at least said leading edge of said group onto said member; and

(iv) decelerate said support means to speed S3 less than S2 to position said group on said member.

4,978,276

PUMP STAGE FOR A HIGH-VACUUM PUMP

Hans-Peter Kabelitz; Winfried Kaiser, and Hans-Guenter Stueber, all of Cologne, Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 10, 1989, Ser. No. 419,194

Claims priority, application European Pat. Off., Oct. 10, 1988, 88116749

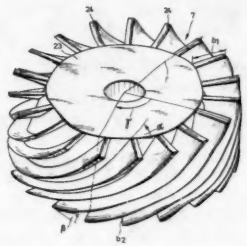
Int. Cl.[5] F04D 29/00, 19/04

U.S. Cl. 415—55.3 20 Claims

11. A pump stage for a high-vacuum pump comprising the following:

a rotor section and a stator section, wherein either the rotor section or the stator section is provided with web means for effecting gas conveying; and

said web means comprises radially extending webs having a pitch and a width that decrease from a suction side of said pump stage to a thrust side of said pump stage from an



attack angle of between 40° and 50°, to an attach angle of between 10° and 20°.

4,978,277

REGENERATIVE TURBOMACHINE

Alan Moore, 4 Partickhill Avenue, Glasgow G11 5AA, Scotland

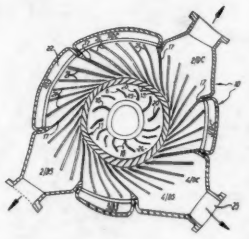
Filed Jul. 25, 1989, Ser. No. 384,997

Claims priority, application United Kingdom, Jul. 26, 1988, 8817789

The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.

Int. Cl.[5] F01D 1/12

U.S. Cl. 415—57.1 8 Claims



1. A regenerative turbomachine comprising:

a rotatable impeller having blades,

an annular housing surrounding the impeller and defining a topologically toroidal flow channel for a working fluid,

an inlet port for admitting working fluid to the housing,

an outlet port spaced circumferentially of the impeller from the inlet port, by which the working fluid can leave the housing,

and guide means for guiding the working fluid entering the inlet port through a slip flow path and a counter-flow path which follow respective spiral paths in circumferentially opposite directions around said toroidal flow channel, each flow path making successive passes through the impeller blading in a generally radial sense,

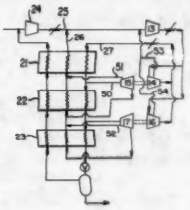
wherein in the slip flow path successive passes are made which reintroduce the working fluid to the impeller blades at circumferential positions spaced successively in the direction of intended impeller rotation, and

in the counter-flow path successive passes are made which reintroduce the working fluid to the impeller blades at circumferential positions spaced successively in the direction counter to the intended direction of impeller rotation.

4,978,278
TURBOMACHINE WITH SEAL FLUID RECOVERY CHANNEL

Leslie C. Kun, Grand Island, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Jul. 12, 1989, Ser. No. 378,904
Int. Cl.[5] F01D 13/02
U.S. Cl. 415—144 19 Claims



1. Turbomachine comprising:

(A) an impeller mounted on a shaft extending radially inward from an outer to an inner diameter and having a plurality of blades mounted thereon;

(B) a shroud covering the blades to form fluid flow channels from the outer to the inner diameter;

(C) a stationary housing spaced from the shroud;

(D) a seal between the shroud and the stationary housing;

(E) channel means communicating with a space between the shroud and the housing adjacent to the tooth portion of to the seal, and extending to the outside of the housing;

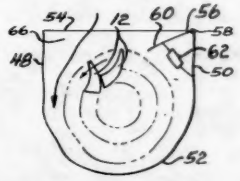
(F) means to recycle fluid from the output of the turbo machine to the input of the turbomachine, said cycle means including means to raise the temperature of the output fluid; and

(G) means to pass fluid from the channel means to the recycle means downstream of said temperature raising means.

4,978,279
SIMPLIFIED INLET GUIDE VANE CONSTRUCTION FOR A ROTARY COMPRESSOR

Colin Rodgers, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Sep. 6, 1988, Ser. No. 240,721
Int. Cl.[5] F01B 25/02
U.S. Cl. 415—151 7 Claims



1. A rotary machine including:

a rotary compressor housing having an axially facing inlet end for receiving a gas to be compressd, an outlet end for discharging compressed gas and a rotor receiving opening extending between said inlet and said outlet;

a rotor having vanes disposed in said opening;

means mounting said rotor for rotation within said opening;

an inlet muff mounted on and in fluid communication with said inlet end and having a radially outward facing periphery provided with an inlet opening whose peripheral length is less than half of said periphery, said muff extending completely around said inlet and

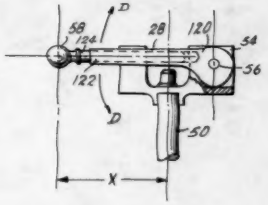
a single vane pivoted to said muff at one end of said inlet opening and extending into said muff toward said inlet end and movable with respect thereto to change the angle of gas flow through said opening to said inlet end, the portion of said muff not including said inlet opening being vane free; and

means for selectively moving said vane.

4,978,280
VARIABLE GUIDE VANE ARRANGEMENT FOR A COMPRESSOR

Henry Tubbs, Kingscote, England, assignor to Rolls-Royce plc, London, England

Continuation-in-part of Ser. No. 233,123, Aug. 17, 1988, Pat. No. 4,867,635. This application May 22, 1989, Ser. No. 355,022
Claims priority, application United Kingdom, Sep. 26, 1987, 8722714
Int. Cl.[5] F01D 17/16
U.S. Cl. 415—159 16 Claims



1. A variable stator vane arrangement for an axial flow compressor comprising a plurality of circumferentially arranged radially extending stator vanes mounted for rotation about their longitudinal axes in a stator structure, a control ring surrounding the stator structure, a plurality of circumferentially arranged operating levers, each operating lever extending from the control ring to a respective stator vane, the control ring being movable between a first position in which the control ring is coaxial with the compressor and a second position in which the axis of the control ring is displaced transversely with respect to the axis of the compressor, the control ring being movable from the first position to the second position such that the stator vanes in a first circumferentially extending zone of the compressor are rotated in a first direction whereby the first zone operates at a relatively higher pressure ratio and the stator vanes in a second diametrically opposite circumferentially extending zone of the compressor are rotated in the opposite direction whereby the second zone operates at a relatively lower pressure ratio; each operating lever comprising two parts, one part being slidably mounted in the outer to allow for variation in effective length of each operating lever.

4,978,281
VIBRATION DAMPENED BLOWER

William W. Conger, IV, 9552 Orange Ave., Anaheim, Calif. 92804

Filed Aug. 19, 1988, Ser. No. 234,377
Int. Cl.[5] F04B 39/00
U.S. Cl. 417—423.15 4 Claims

1. An air blower for a therapy pool, hot tub or the like comprising in combination:

a blower support housing,

a blower cover,

a housing ring interposed between and fixedly connected to the cover and the housing, said ring having a molded body portion,

a motor and fan assembly within the housing and blower cover, and

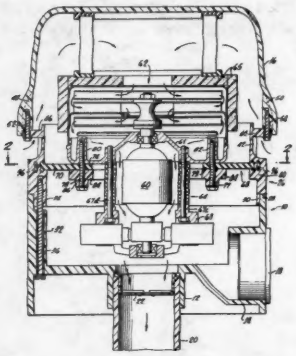
motor mounting means for mounting the motor and fan assembly to the housing ring with decreased vibration, said mounting means comprising:

a flexible, resilient mounting annular having inner and outer peripheral edge portions,

means for securing the motor and fan assembly to the inner peripheral edge portion of the annulus,

said outer peripheral edge portion of the mounting annulus being integrally molded to and within the body portion of said housing ring, whereby the motor mounting annulus is securely and permanently mounted to the housing ring,

said housing ring comprising an injection molded ring formed of a hard rigid plastic, said motor mounting



annular including a radially outward peripheral portion having locking means extending therefrom, said annular being separately molded of a relatively soft, resilient plastic material, said annulus peripheral portion and said locking means being embedded within said housing ring body portion,

said locking means comprising first and second radially spaced peripherally extending ribs projecting from the plane of said mounting annulus, said body portion of the housing ring being molded around and fully encompassing said outward peripheral portion of said annular and said locking means, and a plurality of peripherally spaced holes extending through said motor mounting annular between said ribs, said housing ring having integral portions thereof molded into and extending within said annular holes.

4,978,282

ELECTRICAL FUEL PUMP FOR SMALL MOTORCYCLE ENGINE

Shih-Lien Fu, and Wu-Tsung Dent, both of Hsin-Chu, Taiwan, assignors to Industrial Technology Research Institute, Hsin-chu, Taiwan

Continuation-in-part of Ser. No. 409,961, Sep. 18, 1989, which is a continuation of Ser. No. 156,738, Feb. 18, 1988, abandoned.

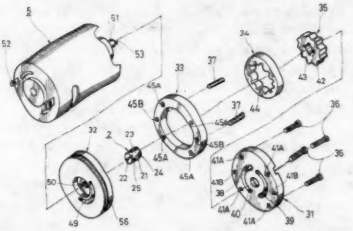
This application Jan. 23, 1990, Ser. No. 469,058

Int. Cl.[5] F04B *35/04, 39/14*

U.S. Cl. 417—360 **3 Claims**

1. An electrical fuel pump for a small motorcycle engine comprising an intake socket for introducing the fuel into said pump, a georor pump for pumping said incoming fuel, a discharge socket for discharging said compressed fuel from said pump, a DC motor for driving said gerotor pump and a casing for receiving said intake socket, said discharge socket, said gerotor pump and said DC motor therein;

said gerotor pump comprising an inlet plate adjacent to said intake socket, an exit plate adjacent to said DC motor, a ring-shaped intermediate plate, having an inner periphery, interposed between said inlet plate and said exit plate, and a pair of engaged rotors, including a toothed inner rotor an a toothed outer rotor received within a cavity surrounded by said inlet plate, said exit plate and said ring-shaped intermediate plate, said outer rotor received in and guided by the inner periphery of said intermediate plate; said pair of toothed rotors being disposed eccentrically relative to each other, a plurality of outer teeth being formed on the outer periphery of said inner rotor and a plurality of inner teeth, more in number than the number on said outer teeth of said inner rotor, being formed on the inner periphery of said outer rotor so that said outer rotor may be driven by said inner rotor through engagement of said inner and outer teeth, and a suction effect and a compression effect may be alternately achieved due to gradual changes in the volume of each cavity formed between engaged inner and outer teeth during the rotation of said pair of rotors so as to suck the fuel from said intake socket and then compress the fuel into said discharge socket;



characterized by:

a coupling interconnecting said inner rotor and the shaft of said DC motor for transmitting the rotation power of said DC motor to said inner rotor; said coupling comprising an intermediate section having a spline shaft-like profile, a first end section rotatably supported by said inlet plate, and a second end section rotatably supported by said exit plate and engaging the output end of said motor shaft, allowing a slight relative axial movement and a slight axial misalignment between said coupling and said motor shaft;

said inner rotor including a central hole having a shape indentical to and slightly larger than said spline shaft-like intermediate section of said coupling so that said intermediate section may be inserted through and engage said central hole for driving said inner rotor, allowing a slight axial movement of said coupling relative to said inner rotor;

whereby said coupling interconnects said DC motor and said gerotor pump in a manner allowing a slight relative axial movement and a slight axial misalignment between said motor shaft and said inner rotor.

4,978,283

PRIMER VALVE FOR CHOP-CHECK PUMP

Kerry G. Vonalt, Edgerton, Ohio, assignor to The Aro Corporation, Bryan, Ohio

Filed Sep. 8, 1989, Ser. No. 404,493

Int. Cl.[5] F04B *7/00*

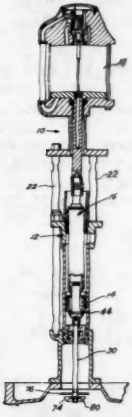
U.S. Cl. 417—511 **11 Claims**

1. In a chop-check pump for viscous material, said pump of the type having cylinder means defining an axis, a drive rod which is axially movable within the cylinder means, a primer valve attached to one end of the drive rod and moveable with the drive rod, a floating check valve mechanism associated with the cylinder means at an outlet from the cylinder means at

the end through which the drive rod extends into the cylinder means, the improvement comprising:

a primer valve including a distal valve plate at the end of the rod and fixed to the rod, said distal valve plate having flow passage means therein, and

a slidable valve plate on the drive rod slidable between a position against the distal valve plate and a position spaced from the distal valve plate, said slidable valve plate having a radial extent greater than that of the distal valve plate, said slidable valve plate having a configuration complementary to that of the cross section of the cylinder means, the slidable valve plate having flow passage means which is exposed only when the plates are separated upon movement of the drive rod in a first direction into the cylinder and engagement of the valve plates with a viscous material within the cylinder means, said flow passage means being closed to flow upon the slidable valve plate engaging against the distal plate when the drive rod is moved in the reverse direction to thereby pump fluid from the cylinder means in response to movement of the slidable valve plate and distal valve plate.

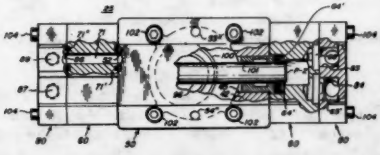


4,978,284

DOUBLE ACTING SIMPLEX PLUNGER PUMP

James E. Cook, 418 Rice St., Anoka, Minn. 55303, and O. Harald S. Eriksen, 6219 Zealand Ave. North, Brooklyn Park, Minn. 55428

Filed Mar. 1, 1990, Ser. No. 487,186
Int. Cl.[5] F04B *19/02*
U.S. Cl. 417—534 18 Claims



1. A double acting simplex plunger pump comprising:

(1) a flat unitary rectangularly shaped crankcase body having (i) spaced apart planar and parallel top and bottom surfaces, (ii) first and second spaced apart end portions having parallel planar end surfaces normal to and joining said top and bottom surfaces, (iii) a crankcase space being centrally located in said body and extending therethrough along a crankcase axis normal to said top and bottom surfaces and, (iv) a bore in each of said first and second end portions, said bores being aligned to define a plunger axis normal to said crankcase axis and to said first and second end surfaces;

(2) a unitary manifold member having a flat rectangular shape with a longitudinal axis, a bottom flat surface and first and second spaced apart manifold ports extending therethrough from a first end to a second end and being mutually parallel to said longitudinal axis, said manifold member being connected to said crankcase body so that said longitudinal axis is parallel to said plunger axis and said manifold bottom flat surface is abutted against said top surface of said crankcase body, said manifold member having a longitudinal length equal to the length of said crankcase body between said planar end surfaces thereof;

(3) first and second stuffing box members each comprising (i) a unitary block having spaced apart planar and parallel inboard and outboard ends, (ii) a plunger receiving recess in and normal to said inboard end, (iii) first and second pump port recesses in and normal to said outboard end and directly connected to said plunger receiving recess, (iv) first and second check valve means respectively and reversely positioned in said first and second pump port recesses so that said first check valve means will admit fluid flow from said plunger receiving recess out through said outboard end and so that said second check valve means will admit fluid flow from said outboard end into said plunger receiving recess, and (v) first and second spaced apart parallel stuffing box bores extending therethrough between said inboard and outboard ends and normal thereto and having the same approximate cross-section and mutual spacing as said first and second manifold ports;

(4) first and second head members each comprising (i) a unitary block having spaced apart inboard and outboard ends, said inboard end having a planar surface, (ii) first and second spaced apart pump valve coacting recesses in and normal to said inboard end and having the same approximate cross-section and mutual spacing as said first and second pump port recesses, (iii) first and second spaced apart head recesses in and normal to said inboard end and having the same approximate cross-section and mutual spacing as said first and second manifold ports and said first and second stuffing box bores, and (iv) first and second inlet/outlet bore means in said head member block respectively separately interconnecting said first and second pump valve coacting recesses respectively with said first and second head recesses;

(5) a plunger member comprising a unitary cylindrical shaft having a preselected longitudinal length, first and second plunger means on the ends thereof, and a centrally located crank engaging section; and

(6) means connecting together (i) said crankcase and assembled manifold member as aforesaid, (ii) said stuffing box members, (iii) said head members, and (iv) said plunger member whereby:

(a) said stuffing box inboard ends are respectively abutted against said first and second end surfaces of said crankcase body with said plunger receiving recess thereof aligned with said plunger axis of said crankcase body and with said first and second stuffing box bores being respectively positioned in register with said first and second manifold ports,

(b) said inboard ends of said first and second head members are respectively abutted against said outboard ends of said first and second stuffing box members, with said first and second pump valve coacting recesses being respectively positioned in register with said first and second pump port recesses, and with said first and second head recesses being respectively positioned in register with said first and second stuffing box bores, and

(c) said plunger member being positioned within said crankcase body for reciprocation relative thereto along said plunger axis, said plunger ends coacting alternately

with said pump port recesses of said stuffing box members to provide a pumping action.

4,978,285

REED VALVE FOR HERMETIC COMPRESSOR

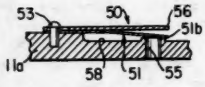
Caio Mario F. N. Da Costa, Joinville, Brazil, assignor to Empresa Brasileira de Compressores S.A., Joinville, Brazil

Filed Feb. 27, 1990, Ser. No. 486,556

Claims priority, application Brazil, Mar. 16, 1989, 8901306[U]

Int. Cl.[5] F04B *21/02*

U.S. Cl. 417—569 12 Claims



1. A compressor having

a housing,

a cylinder within said housing;

a piston for moving within said cylinder,

means for defining with said cylinder a suction chamber and a compression chamber,

said defining means including a plate with a through passage in a fluid communication with one of said chambers, said passage having an outlet in a first plane at one face of the plate,

a blade valve having one end for sealing said outlet,

said blade valve being elastically deformable in response to the pressure differential between the chamber with which the passage communicates and the interior of the housing;

means for attaching the other end of said blade in a second plane spaced from said first plane,

at least a portion of the blade between said ends being at an angle between the two planes to place the one end of the blade in sealing relationship to at least the edge of the passage outlet which is furthest from the blade other end when there is no pressure differential, between the communicating chamber and the inside of the housing.

4,978,286

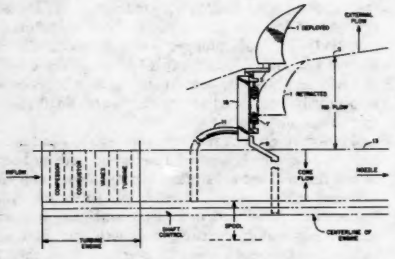
VARIABLE CYCLE ENGINE PASSIVE MECHANISM

Francis X. Hurley, Chapel Hill, N.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 17, 1989, Ser. No. 424,361

Int. Cl.[5] B63A *1/06*

U.S. Cl. 416—89 2 Claims



1. A mechanism for varying the cycle of a turbine power plant comprising:

a housing connected to said turbine engine such that said housing rotates at the same speed as the spool of said engine;

a plurality of propeller blades slideably attached to said housing such that at maximum rotational speed of said turbine engine said blades are extended beyond the cowling of said engine thus providing external airflow;

means for causing said propeller blades to stow within the confines of said cowling of said engine at minimum rotational speed of said engine thus providing no external airflow;

means for varying the pitch of said propeller blades.

4,978,287

HORIZONTAL CRANKSHAFT ROTARY COMPRESSOR WITH OIL DRAIN TUBE FROM MUFFLER TO INTERIOR OF SHELL

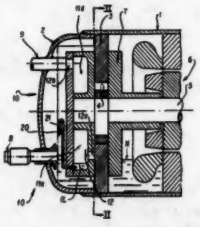
Caio M. F. N. Da Costa, Joinville, Brazil, assignor to Empresa Brasileira de Compressores, Joinville, Brazil

Filed Aug. 15, 1989, Ser. No. 394,359

Claims priority, application Brazil, Sep. 21, 1988, PI8804948

Int. Cl.[5] F04C *29/06, 29/02*

U.S. Cl. 418—96 6 Claims



1. A horizontal crankshaft rotary compressor which is oil lubricated comprising:

a housing,

a motor compressor set within said housing, said compressor having a cylinder with a discharge volume and a discharge valve therefore, said housing serving as a sump for the oil,

a discharge muffler in communication with the cylinder discharge volume through the discharge valve,

an oil draining tube having one end in communication with the muffler interior at a point where oil can accumulate and the other end in the housing at a point above the oil level in the sump.

4,978,288

APPARATUS FOR USE IN PRODUCING PELLETS

Henry Ellwood, Rochdale, England, assignor to Farrell Limited, Rochdale, United Kingdom

Filed Jun. 14, 1989, Ser. No. 365,926

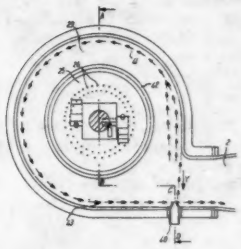
Claims priority, application United Kingdom, Jun. 17, 1988, 8814437

Int. Cl.[5] B29B *9/06*

U.S. Cl. 425—311 9 Claims

1. Apparatus for use in producing pellets of plastics material comprising an extrusion chamber having an axis of extrusion, a pellet plate defining a plurality of holes through which material may be extruded from the extrusion chamber, blade means mounted for movement relative to the pellet plate for producing pellets from material extruded through the holes, a further chamber in which the blade means are disposed and having a chamber periphery, a fluid inlet leading into the further chamber and a fluid outlet leading from the further chamber, the fluid inlet and fluid outlet being in substantially the same plane, which plane is substantially traverse to the axis of extrusion, and including means for inhibiting fluid from flowing across the pellet plate, whereby in use fluid introduced into the fluid

inlet in an inlet fluid flow travels around the periphery of the further chamber only once collecting pellets produced by the



blade means and carries the pellets out of the further chamber in an exit fluid flow.

4,978,289

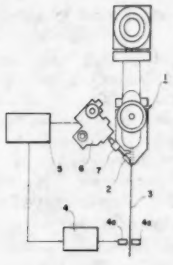
FILM EXTRUSION DIE

Mokichi Maejima, Tokyo, Japan, assignor to Jyohoku Seiko Co., Ltd., Tokyo, Japan

Filed Oct. 5, 1989, Ser. No. 417,442

Int. Cl.[5] B29C *47/16, 47/92*

U.S. Cl. 425—141 **2 Claims**



1. A T-shaped film extrusion die comprising a T-shaped die main body, a device for detecting the thickness of a resin film formed by extrusion to generate a detection signal, a device for generating a correction signal on the basis of a difference between the detection signal and preset thickness data, and a lip-width adjusting device for driving lip-width adjusting bolts on the basis of the correction signal to adjust the width between lips of the die so that the resin film has a preset thickness; said lip-width adjusting device comprising a motor, a drive shaft driven by said motor, worms arranged on said drive shaft, lip-width adjusting bolt drive shafts respectively arranged near said worms, worm wheels arranged at respective one ends of said lip-width adjusting bolt drive shafts, and clutches for transmitting/disengaging a drive force of said motor from said drive shaft to said worm wheels through said worms; and said clutch comprising a set of clutch plates respectively having cuts, the arrangement pattern of the cuts of each clutch plate being different in longitudinal relation from those of the cuts of the other clutch plates, and a clutch head arranged to be in contact with said set of clutch plates, said clutch plates being independently parallelly moved to align or misalign the cuts of said clutch plates at a contact position of said clutch head, so that said clutch head is operated to engage/disengage said clutch.

4,978,290

MOLDING DEVICE

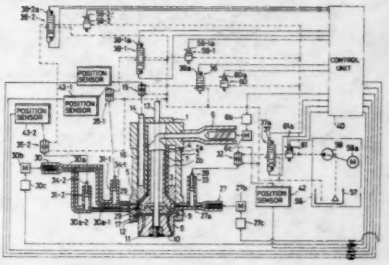
Keiji Fukuhara, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 28, 1989, Ser. No. 344,953

Claims priority, application Japan, Apr. 28, 1988, 63-105936

Int. Cl.[5] B29C *47/92*

U.S. Cl. 425—147 **20 Claims**



1. A molding device for manufacturing a multiple layer product comprising:

a first extruding means for extruding a first material to be molded to form said multiple layer product, said multiple layer product having at least two layers,

blow head means for receiving the first material from the extruding means and for supplying the first material to mold means,

first passage means connected with the first extruding means and divided into a plurality of first branch passage means connected respectively with the blow head means for forming different layers of the multiple layer product,

accumulator means provided on each of the first branch passage means for controlling a supply of the first material toward the blow head means,

detecting means provided in the accumulator means for detecting a quantity of the first material introduced into the accumulator means, and

lock means for locking the accumulator means when the first material detected by the detecting means reaches a predetermined quantity.

4,978,291

METHOD OF REGULATING THE FUEL-AIR MIXTURE IN A BURNER

Gary T. Nakai, 11616 Woodcreek Dr., South, Apt. F, Huntley, Ill. 60142

Division of Ser. No. 89,237, Aug. 24, 1987, Pat. No. 4,934,924, which is a continuation-in-part of Ser. No. 797,392, Nov. 12, 1985, Pat. No. 4,706,644. This application Oct. 6, 1989, Ser. No. 417,825

Int. Cl.[5] F23N *1/02*

U.S. Cl. 431—12 **1 Claim**

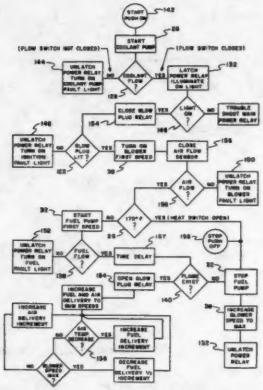
1. A method for regulating the fuel-air mixture of a fuel burner, said burner having a temperature sensor for sensing the temperature of the heat produced by the burner, a fuel pump for delivering fuel to the burner, means for controlling fuel delivery by a predetermined increment or a fraction thereof, a blower for delivering air to the burner, means for incrementally controlling air delivery and means for detecting air delivery to the burner up to a predetermined maximum, comprising the steps of:

(a) monitoring the temperature of the heat produced by the burner to detect whether a change in temperature has occurred over a predetermined interval of time;

(b) increasing fuel delivery by an increment when a decrease in said change in temperature has been detected;

(c) detecting air delivery to the burner when an increase in said change in temperature has been detected;

(d) increasing air delivery by an increment, when an increase in said change of temperature has been detected and air delivery is not at maximum; and



(e) decreasing fuel delivery by a fraction of an increment when an increase in said change of temperature has been detected and air delivery is at maximum.

4,978,292

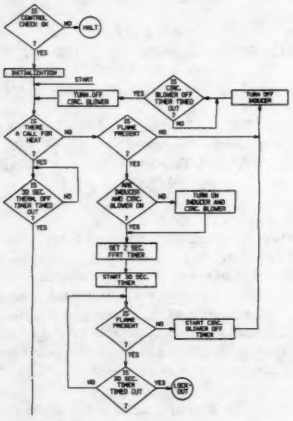
FUEL BURNER CONTROL SYSTEM WITH HOT SURFACE IGNITION

Donald E. Donnelly, Glen Carbon, Ill.; Bradley C. Zikes, St. Louis County; Dwain F. Moore, Marlborough; Jeffrey E. Price, St. Louis County, and Bartholomew L. Toth, Crestwood, all of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 315,919, Feb. 27, 1989, Pat. No. 4,925,386. This application Mar. 5, 1990, Ser. No. 488,221

Int. Cl.[5] F23N *5/00*

U.S. Cl. 431—75 **4 Claims**



1. In a fuel burner control system,

a burner;

valve means controlling the flow of fuel to said burner;

an igniter for igniting said fuel at said burner;

means for sensing flame at said burner;

a circulator blower for distributing air; heated by said flame

means for establishing a call for heat; and

means responsive to a sensed flame during a time when there is no call for heat for effecting energizing of said circulator blower.

4,978,293

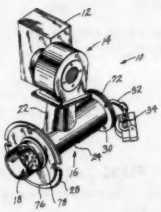
NOZZLE MIX, OPEN POWER BURNER

Robert W. Ryno, El Paso, Tex., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Jul. 19, 1989, Ser. No. 382,440

Int. Cl.[5] F23Q *7/06*

U.S. Cl. 431—258 **3 Claims**



1. A power gas burner assembly, comprising:

a substantially horizontal tubular housing including an air inlet formed in a side thereof;

a blower for supplying pressurized air to said air inlet;

a substantially vertical flame retention plate adapted for placement at one end of said tubular housing and including a plurality of openings therein, said openings outletting pressurized air from said housing;

a mounting plate adapted for placement at the other end of said tubular housing for substantially sealing the other end of said housing;

a gas tube extending through said mounting plate, said housing and said flame retention plate and including a gas outlet disposed downstream of said flame retention plate for discharging gas from said gas tube radially outwardly and into the path of air flowing through the openings in said flame retention plate for mixing gas and air;

a hot surface igniter mounted to the upper portion of said flame retention plate and disposed within the flow path of mixed gas and air for igniting mixed gas and air downstream of said flame retention plate; and

an air deflector plate mounted to said gas tube and disposed in the interior of said air tube for directing air flowing through said air tube upwardly toward said hot surface igniter.

4,978,294

EXTERNAL HEATING ROTARY FURNACE

Tadashi Uemura, Tokuyama, and Shirou Hayashi, Ibaraki, both of Japan, assignors to Tosera Engineering Co., Ltd., Aichi; Showa Denko Kabushiki Kaisha and Shunan Denko Kabushiki Kaisha, both of Tokyo, all of, Japan

PCT No. PCT/JP88/00878, § 371 Date Apr. 26, 1989, § 102(e) Date Apr. 26, 1989, PCT Pub. No. WO89/02057, PCT Pub. Date Mar. 9, 1989

PCT Filed Sep. 1, 1988, Ser. No. 381,703

Claims priority, application Japan, Sep. 3, 1987, 62-219232

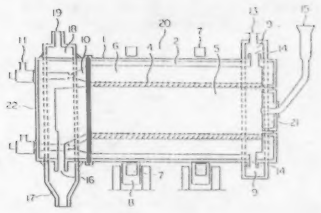
Int. Cl.[5] F27B *7/00*

U.S. Cl. 432—103 **1 Claim**

1. An external heating rotary furnace comprising following rotary members capable of rotating therewith and being integral therewith:

(a) supporting bricks (3) which support ceramic plates 4 and

are lined around a inner surface of the steel mantle (1), the height of which is not uniform around the steel mantle but higher than another at an appropriate distance between them, (b) reaction chamber (5), which is located at the center of the rotary furnace body (20), and defined by polygons made of heat resistant ceramic plates (4) supported by a supporting bricks (3), and heat insulating bricks (2), (c) plurality of heatig gas chambers (6) which are each formed around the reaction chamber (5) by the heat insulative brick (2), supporting brick (3) and ceramic insulating plate (4), (d) burner (11) provided at the each end of the heating gas chamber (6).



4,978,295

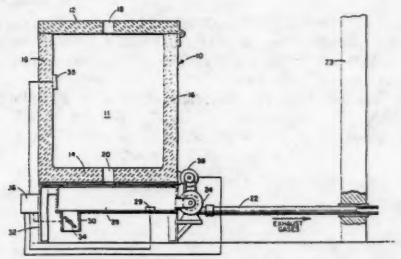
KILN WITH VENTILATION SYSTEM

Milan Vukovich, Jr., Galena, Ohio, assignor to Edward Orton Jr., Ceramic Foundation, Westerville, Ohio

Continuation of Ser. No. 185,366, Apr. 21, 1988, Pat. No. 4,863,374, which is a continuation of Ser. No. 30,584, Mar. 27, 1987, abandoned. This application Apr. 25, 1989, Ser. No. 343,735

Int. Cl.[5] F27B *5/00*

U.S. Cl. 432—120 **13 Claims**



1. An electrically heated kiln having a ventilation system for oxidizing ceramic objects being fired in the interior of the kiln and for safely ventilating kiln gases produced during the firing process while providing greater uniformity in temperature inside the kiln, said kiln comprising:

an upper wall, a lower wall and side walls forming a substantially fully enclosed firing chamber in which ceramic objects are placed;

at least one upper ventilation aperture means formed in the upper portion of said firing chamber through which incoming air may be drawn into the firing chamber;

at least one lower ventilation aperture means formed in the lower portion of said firing chamber;

a duct coupled between said lower ventilation aperture means and the outside environment; and

an exhaust fan means coupled to said duct for placing the firing chamber under negative pressure so that kiln gases produced within the kiln are prevented from escaping from said firing chamber through said upper aperture means into the room where the kiln is located, said fan means drawing air into said firing chamber through said upper aperture means and drawing air and kiln gases downwardly through said firing chamber and outwardly through said lower ventilation aperture means into said duct, the downward movement of the air and kiln gases causing turbulence near the upper portion of said firing chamber to create a more uniform temperature within said firing chamber;

said upper and lower aperture means being sized and the draw rate of said exhaust fan means being selected to limit the amount of air withdrawn at the bottom of the kiln so that less than 100% of the kiln volume is removed per minute when the kiln is operated at room temperature.

4,978,296

DISPOSABLE TOOTH COLOR SHADE GUIDE

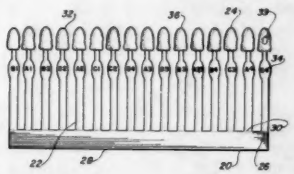
Peter Antons, and Samra L. Antons, both of 2 Oak Grove, both of Irvine, Calif. 92714

Continuation-in-part of Ser. No. 334,364, Apr. 7, 1989, Pat. No. 4,919,617. This application Nov. 6, 1989, Ser. No. 432,203

The portion of the term of this patent subsequent to Apr. 24, 2006, has been disclaimed.

Int. Cl.[5] A61C *19/10*

U.S. Cl. 433—26 **6 Claims**



1. A disposable tooth color shade guide for identifying the industry standard color of teeth comprising:

(a) a flat thin body having a front and a back;

(b) at least one finger formed integral with said body each having an extended end and an attached end;

(c) a base portion, formed integrally with said body, having perforations dividing the base portion from each finger at the attached end, such that each finger may be removed by tearing allowing an individual finger of the guide to be used and discarded thereafter;

(d) a distinct color shade specimen disposed upon the front extended end of each finger, each specimen having a different hue, severally matching the industry standard for the majority of human teeth;

(e) an opaque outline on the periphery of each color shade specimen distinctly defining the contrast over the true tooth color;

(f) indica residing on each finger connotating the customary standard shade of each specimen allowing a tooth to be matched in color when being replaced by a dental prosthesis; and,

(g) visual indication discreetly positioned on said body appearing within a predetermined time indicating a warning in writing of prior usage of the tooth color shade guide preventing cross-contamination of patients by using the same guide.

4,978,297

HANDPIECE WITH ADDITIVE CHAMBER

David G. Vlock, 12 Fifth Ave., New York, N.Y. 10011-8857

Filed Sep. 19, 1989, Ser. No. 409,240

Int. Cl.[5] A61C *3/02*

U.S. Cl. 433—88 **8 Claims**

1. A handpiece device for use with a water stream and an additive comprising:

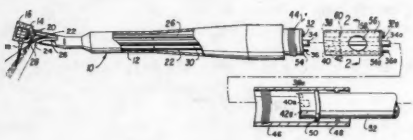
a handle housing having a head end;

a tool receiving rotor rotatably mounted to said head end for receiving a rotary tool to be used in a procedure;

water supply means operatively connected to said handle housing for defining a water stream terminating at a water nozzle adjacent said head end;

auxiliary chamber means connected to said handle housing and defining an auxiliary chamber communicating with said water stream, said auxiliary chamber including an opening for receiving an additive for introduction of the additive into the water stream; and

closure means connected to said auxiliary chamber means for opening said auxiliary chamber opening to receive the additive and for closing the auxiliary chamber opening for sealing the auxiliary chamber against loss of water from said water stream;



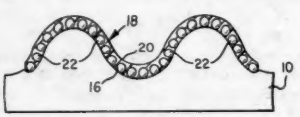
said handle housing including a supply end opposite from said head end, said water supply means including a first water coupling connected to said supply end and a water supply hose having a second water supply coupling, said auxiliary chamber means comprising an auxiliary chamber member containing said auxiliary chamber therein, detechably connected to said handle housing, said auxiliary chamber member having a third water supply coupling for coupling to said first water supply coupling and a fourth water supply coupling for coupling to said second water supply coupling, for passing the water stream through said auxiliary chamber from said water supply hose to said first water supply coupling.

4,978,298

DENTAL MOLDING PROCESS

Michael R. Eliasz, 8215 Westchester, Ste. 145, Dallas, Tex. 75225

Filed Apr. 20, 1989, Ser. No. 342,248
Int. Cl.[5] A61C 11/00
U.S. Cl. 433—213 **13 Claims**



1. A method for making a removable prosthetic for the human mouth, the mouth having irregular contours and a gum line, the method including the preparation of a preliminary plaster cast of the contours and gum line, the method comprising the steps of:

forming a sheet over the contoured surface of the preliminary plaster cast, the sheet including a pliable material and a filler comprising a plurality of particles of predetermined diameter;

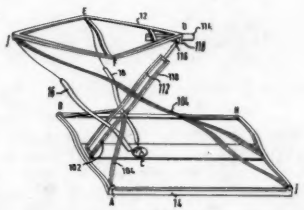
using the particles to determine the thickness of the sheet over the contoured surface of the plaster cast, exposure of a particle in a first area indicating the sheet is too thin in the first area, covering of a particle in a second area indicating the sheet is too thick in the second area.

4,978,299

SIMULATOR MECHANISM

Phillip R. M. Denne, Dorset, Great Britain, assignor to Super X Limited, Southampton, Great Britain

PCT No. PCT/GB88/00800, § 371 Date Apr. 12, 1990, § 102(e) Date Apr. 12, 1990, PCT Pub. No. WO89/03107, PCT Pub. Date Apr. 6, 1989
PCT Filed Sep. 29, 1988, Ser. No. 469,491
Claims priority, application United Kingdom, Sep. 29, 1987, 8722853
Int. Cl.[5] G09B 9/06
U.S. Cl. 434—58 **8 Claims**



1. A simulator mechanism capable of operating in three degrees of freedom, including a base having a fixed plane, a simulator operating plane and three independent extendible actuators capable of changing the operating plane, characterized in that:

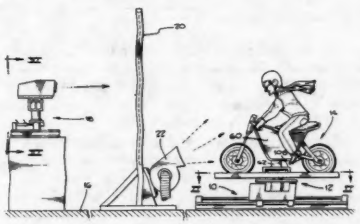
the three actuators are pivotally coupled with universal freedom at a generally single on the base plane, said single point comprising closely aligned connection points for the three actuators; each actuators is pivotally coupled at a spaced apart point on the simulator operating plane.

4,978,300

HIGH PERFORMANCE MOTORCYCLE SIMULATOR

Howard Letovsky, Los Angeles, and Bernard Fried, Beverly Hills, both of Calif., assignors to Bernard Fried Racing Enterprises, Beverly Hills, Calif.

Continuation of Ser. No. 324,172, Mar. 16, 1989, Pat. No. 4,887,967. This application Sep. 26, 1989, Ser. No. 412,671
The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.
Int. Cl.[5] G09B 9/04
U.S. Cl. 434—61 **27 Claims**



1. A motorcycle simulator comprising:

a motorcycle mount assembly;

a motorcycle frame having a front end and a rear end and including a front fork assembly, main frame and rear fork assembly wherein said motorcycle frame is attached to said mount assembly at said main frame;

roll means for controllably moving the motorcycle frame from a vertical position to inclined positions on the left or right side of said vertical position;

front fork elevator means for controllably lowering and raising the front end of said motorcycle frame;

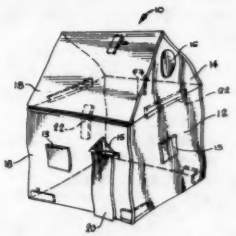
rear fork elevator means for controllably lowering and raising the rear end of said motorcycle frame independently of said front fork elevator means wherein said roll means, front fork elevator means and rear fork elevator means can be controlled to provide movement of said motorcycle frame to thereby provide a simulation of riding a motorcycle.

4,978,301

EDUCATIONAL CONSTRUCTION SET

Tyler H. Dodge, 130 Cooders Rd., Arcata, Calif. 95521

Filed May 22, 1989, Ser. No. 355,208
Int. Cl.[5] G09B 19/00
U.S. Cl. 434—96 23 Claims



16. A construction set for educational purposes, the construction set comprising,

a plurality of semi-rigid, pattern-independent planar construction pieces of various shapes including squares, triangles and circles, each construction piece having opposed first and second major sides and having edges joining the major sides, said first major side having a central area covered by loop pile fastener and said second major side having a central area covered by hook fastener material, the hook fastener material being of the type to adhere to the loop pile fastener material, each major side having a narrow margin area [surrounding] bordering the central area, the margin area and said edges being free of fastener material, one of said first and second major sides having a primary first color and said opposite major side having a complementary second color of said first color, said first and second colors covering the central area of their respective sides, and

a plurality of generally rectangular shaped connector strips for joining construction pieces in adjacent relation, each connector strip having opposed first and second major sides, the first major side having loop pile fastener material and the second major side having hook fastener material, said first major side of all connector strips having a first color and said second major side of all connector strips having a differing second color, thereby providing each construction piece and connector strip of the construction set with major sides having distinct characteristics with respect to mechanical coupling and color.

4,978,302

COMPUTER PROGRAM FOR TEACHING LAND MASS RECOGNITION

Mary Clossey, 433 Oakdene Ave., Cliffside Park, N.J. 07010

Filed Nov. 20, 1989, Ser. No. 438,792
Int. Cl.[5] G09B 29/10, 7/00
U.S. Cl. 434—153 3 Claims

1. A computer process implemented by a computer program to facilitate recognition of land masses by their shape for the purpose of serving as a teaching aid, said process comprising steps for:

(1) generating a visual display on a computer screen of a plurality of land masses in their natural configuration;

(2) generating representations for each of said plurality of land masses;

(3) storing the generated representations in a first memory location;

(4) generating a plurality of indicia for each of said plurality of land masses;

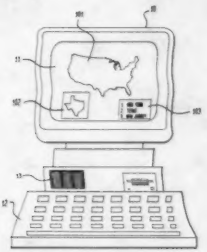
(5) storing the generated indicia in a second memory location;

(6) registering the correct pairing of said indicia and said representations of land masses;

(7) storing the registered correct pairing in a third memory location;

(8) randomly selecting one of said representations for a land mass;

(9) generating within a first window on a computer screen a visual display of said randomly selected one of said plurality of representations for land masses, contemporaneously



with the visual display of said plurality of land masses in their natural configuration;

(10) generating a list of indicia for the displayed one of said plurality of representations;

(11) generating within a second window on a computer screen a visual display of said plurality of indicia for each of said plurality of land masses, contemporaneously with the visual display of said plurality of land masses and the visual display within said first window on a computer screen of one of said plurality of land masses;

(12) registering selected pairing by the user of said one of said plurality of land masses and one of said plurality of indicia for said plurality of land masses;

(13) comparing the registered selected pairing with the registered correct pairing of said one of said plurality of land masses and one of said plurality of indicia for said plurality of land masses;

(14) audibly indicating the matching of the selected pairing and the correct pairing;

(15) repeating steps (8)–(15).

4,978,303

PHYSICAL ACUITY TEST DEVICE

Al Lampbell, Santa Clara, Calif., assignor to Savalife, A California General Partnership, Larkspur, Calif.

Filed Feb. 6, 1989, Ser. No. 307,294
Int. Cl.[5] G09B 19/00
U.S. Cl. 434—258 7 Claims

1. A device for determining an individual user's acuity at a given time, comprising:

first generating means for generating a first pattern;

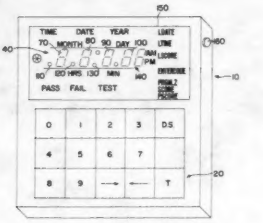
means connected to the generating means for displaying the pattern in an alphanumeric form visually readable by the individual user for testing the individual user's physical acuity;

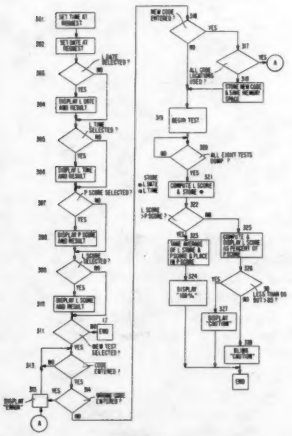
second generating means for manually generating a second alphanumeric pattern by the individual user;

first determining means connected to the first and second generating means for determining an elapsed length of time between the display of the first alphanumeric pattern and the generating of the second alphanumeric pattern by the individual user;

second determining means for determining a minimum number of actions necessary to generate the second alphanumeric pattern by said second generating means;

third determining means for determining a matching result of the second alphanumeric pattern with the first alphanumeric pattern;





means connected to said second generating means for counting a number of actions actually taken by the individual user in generating the second alphanumeric pattern; and

means connected to said first determining means and a predetermined standard length of time for generating a first comparison of the elapsed time, means connected to said second determining means and said counting means for generating a second comparison between said minimum number of actions and said number of actions actually taken, and means based upon said first and second comparisons and the matching result from said third determining means for outputting a signal to said displaying means for indicating the individual user's physical acuity.

4,978,304

TRAINING AID FOR SHOELACE TYING

Dean D. Alexander, 1839 Foothill Blvd., La Verne, Calif. 91750

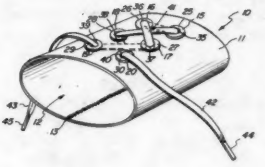
Filed Aug. 21, 1989, Ser. No. 396,291

Int. Cl.[5] G09B *9/00*

U.S. Cl. 434—260 **6 Claims**

1. A training aid for shoelace tying comprising:

an expandable sleeve formed of a layer of flexible material configured to be attachable to the toe and instep portion of a shoe and expandable to accommodate a range of shoe sizes, said sleeve defining a plurality of apertures arranged in two generally parallel rows and having a continuous uninterrupted portion of said layer between said rows of apertures; and



lace means including a plurality of generally annular eyelets supported within said apertures for supporting a shoelace such that the shoelace may be laced through said eyelets and the end portions of the shoelace extend from said expandable sleeve.

4,978,305

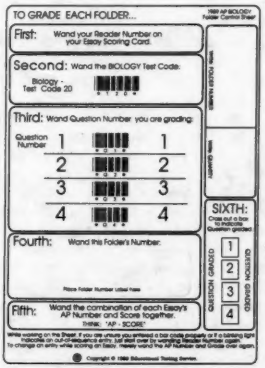
FREE RESPONSE TEST GRADING METHOD

William D. Kraft, Middlesex County, N.J., assignor to Educational Testing Service, Princeton, N.J.

Filed Jun. 6, 1989, Ser. No. 362,262

Int. Cl.[5] G09B *7/00*

U.S. Cl. 434—353 **20 Claims**



1. A method for processing free response test questions while maintaining the independence of grades and reducing paper handling comprising:

selectively associating with a test-taker machine-readable data code associated with the test-taker;

retrievably storing said association;

assembling test-taker materials which bear machine-readable data code associated with the test-taker;

selectively associating with a reader machine-readable data code associated with the reader;

retrievably storing said association;

assembling reader materials which bear the machine-readable data code associated with the reader;

selectively associating with a grade machine-readable data code associated with the grade;

assembling grade materials which bear the machine-readable data code associated with the grade;

selectively associating with a test machine-readable data codes associated with the test;

retrievably storing said association;

assembling test materials which bear the machine-readable data code associated with the test;

selectively associating with a test question machine-readable data code associated with the test question;

assembling test question materials which bear the machine-readable data associated with the test question;

assembling for all test-takers at a grading location test-taker materials, reader materials, grade materials, test materials and test question materials;

receiving selectively generated reader input for assigning a grade to said test materials;

selectively scanning, with a portable sensing device located at the grading location, the machine-readable data codes associated with the test-taker, the reader, the grade for the test question, the test, and the test question, for each question graded by a reader;

wherein the data code associated with the grade is scanned as the grade is assigned;

retrievably storing the data codes scanned by the sensing device and an indication of the time of the scanning; and

processing the stored data codes and the stored data code associations on a computer.

4,978,306

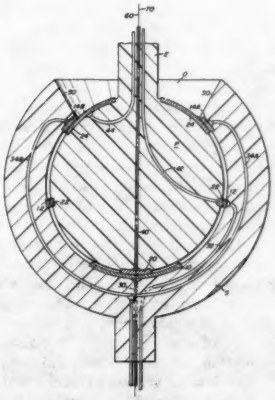
SNAP-APART UNIVERSAL JOINTED ELECTRICAL CONNECTION

John R. Robb, 7520 Hornwood, Ste. 608, Houston, Tex. 77036

Filed Oct. 13, 1989, Ser. No. 421,251

Int. Cl.[5] H01R *35/00*

U.S. Cl. 439—8 **11 Claims**



1. A snap-together universal-jointed electrical connection device, comprising:

an essentially spherical plug having a first conducting portion on its external surface, the plug being connected to an extension portion;

a first plug electrical conductor disposed internally of said plug and electrically connected to said first conducting portion, said conductor extending from said plug through said extension portion;

an essentially spherical socket having a first conducting portion on its interior surface, the socket dimensioned to closely receive and hold the plug while permitting the plug to rotate and swivel within the socket, the socket holding the plug such that a portion of the plug's first conducting surface is in contact with a portion of the socket's first conducting surface;

the socket having an opening of lesser area than a great circle area of the plug, portions of the socket around said opening being comprised of elastic material that resiliently deforms to permit the plug to be pushed into and pulled out of the socket, said resiliency assuring that the portions of the socket reassume the original shape wherein the socket closely receives and holds the plug when the plug is within the socket, and said plug extension portion extending out of the opening when the plug is in the socket.

4,978,307

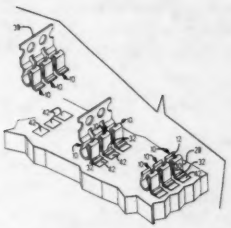
ELECTRICAL SOCKET FOR SUBSTRATES

Timothy B. Billman, King, N.C., and Attalee S. Taylor, Palmyra, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 7, 1989, Ser. No. 390,590

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—83 **4 Claims**



1. An electrical socket for mounting on a substrate and for receiving a post extending from an electronic package, comprising:

a receptacle having a bight and a pair of legs extending outwardly from each side of said bight to define a U-shaped receptacle, one leg thereof being provided with a longitudinal slot extending from adjacent one end to adjacent said bight, said slot being adapted to guide a post being inserted into said receptacle; and

a mounting section attached to and extending from one of said legs and having a strap which extends generally parallel to said legs and a solder foot attached to a free end of said strap and extending outwardly away from said receptacle, said solder foot adapted for being soldered to a circuit pad on a substrate.

4,978,308

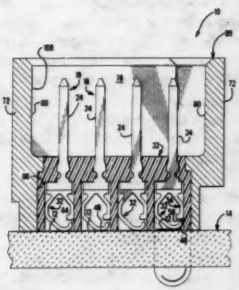
SURFACE MOUNT PIN HEADER

John W. Kaufman, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 18, 1989, Ser. No. 452,523

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—83 **18 Claims**



1. A pin header for use in a two piece connector system, said pin header comprising:

a housing shell having a plurality of cavities defined by side walls, end walls and transverse walls spaced along the length of said shell and extending between and attached to said side walls;

a plurality of inserts disposed in respective cavities; and

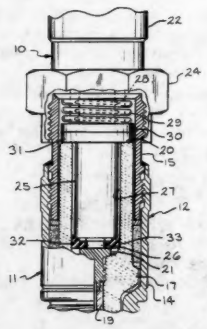
a plurality of contact elements retained in said inserts, said elements having at one end a post extending outwardly from one surface of said inserts, a resilient spring arm and another arm, said spring arm extending outwardly from an aperture in said insert and having a contact surface facing outwardly from an opposite surface of said inserts and compressible thereinto, said contact surface being adapted to electrically engage a circuit on a substrate on which the pin header may be mounted, further said spring arm and said another arm having portions thereon which abut walls defining said aperture.

4,978,309

IGNITER CABLE CONNECTOR

Stephen W. Straub, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio

Filed Mar. 17, 1989, Ser. No. 327,476
Int. Cl.[5] H01R *13/52*
U.S. Cl. 439—126 **2 Claims**



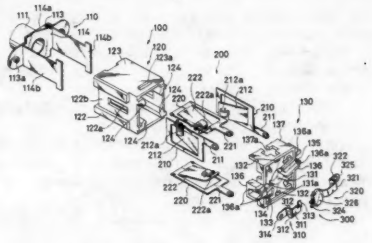
1. A connection between a high voltage ignition cable and an igniter, said igniter having an outer shell surrounding a tubular insulator about the axis of said insulator, said shell and insulator having adjacent open ends with exterior threads on said shell end, said igniter having a center electrode terminal recessed in said tubular insulator, and a connector having a coupling nut threaded to engage said threaded shell end, a projecting cylindrical insulator having a free end and a high voltage contact at said free end, said connector insulator projecting into said igniter insulator with said contact electrically contacting said center electrode terminal when said connector is attached to said igniter, and a first annular seal on said connector engaging said igniter insulator end when said connector is attached to said igniter, the improvement comprising a second seal between said igniter insulator and said connector insulator spaced from said first seal and extending about the axis of said insulator, and wherein said second seal is a resilient O-ring seal located between said connector insulator and the interior wall of said tubular igniter insulator.

4,978,310

ELECTRICAL JACK CONNECTOR

Akihito Shichida, Higashiosaka, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Nov. 20, 1989, Ser. No. 439,736
Claims priority, application Japan, Jan. 17, 1989, 1-4210[U]
Int. Cl.[5] H01R *13/703, 17/18*
U.S. Cl. 439—188 **4 Claims**



1. An electrical jack assembly for connecting a rotary plug having a cylindrical trunk and a head end, said jack comprising:

a casing having a front end and a rear end;

a sleeve unit affixed to said casing front end, said sleeve unit having a cylindrical sleeve formed with a central bore for insertion of a cylindrical trunk of a plug;

two pairs of electrically conductive spring leaf contact frames positioned within said casing, said frames having leaves angled inwardly, each being provided with an oil-impregnated roller at an end arranged to contact the trunk of a plug inserted into said cylindrical sleeve at right angles to a longitudinal axis of the plug; and

a rear cover affixed to said casing rear end, said rear cover having a central hole positioned to receive a head end of an inserted plug and having a switch unit mounted thereon, wherein said switch unit comprises a first segment mounted externally of said rear cover and having a contact positioned adjacent a perimeter of said central hole, and a second resilient segment mounted externally on said rear cover having an insulating plug contact mount positioned at said central hole and a contact formed at an end thereof so as to resiliently engage said contact of said first segment, such that a head end of a plug inserted in said cylindrical sleeve passes through said central hole to make contact with said insulating contact mount causing actuation of said contacts of said switch unit first and second segments.

4,978,311

ELECTRICAL CONNECTOR HAVING CONNECTOR-OPERABLE SHORTING BAR

Kenzo Oda, Hadano, and Seiji Hirano, Hiroshima, both of Japan, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 4, 1989, Ser. No. 417,220
Claims priority, application Japan, Oct. 27, 1988, 63-271654
Int. Cl.[5] H01R *13/703*
U.S. Cl. 439—188 **5 Claims**

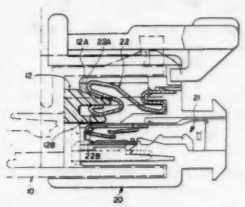
1. An electrical connector, comprising;

matable connector housings having matable electrical contacts means;

shortening bar means secured in one of the connector housings and having first and second sloped sections, the first sloped section electrically engaging the electrical contact means in the connector housing adjacent said shorting bar means when the connector housings are unmated, the

second sloped section spaced outwardly from the first sloped section;

operating means on the other of the connector housings and having first and second operating projections for engagement with the respective ones of the first and second



sloped sections to move the shorting bar means out of engagement with the electrical contact means when the connector housings are mated; the operating means moving the shorting bar means from the electrical contact means even if one of the operating projections is broken.

4,978,312

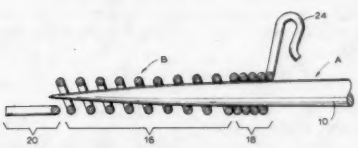
TIP ATTACHMENT FOR CIRCUIT PROBE TESTER

Adolph Fodali, Lake Hiawatha, N.J., assignor to S & G Tool Aid Corp., Newark, N.J.

Continuation of Ser. No. 197,659, May 23, 1988, abandoned. This application Oct. 24, 1989, Ser. No. 414,586

Int. Cl.[5] H01R *11/18*

U.S. Cl. 439—219 **20 Claims**



1. For use with a hand held circuit tester having an ice pick type probe, an attachment adapted for removable mounting on the probe cmprising a coil spring of resilient wire having an axis, said coil spring comprising a portion for fictionally engaging the probe at a location spaced from the end of the probe, a flexible portion extending from said engaging portion towards the end of the probe, and flexible portion comprising spaced turns of wire compressible in the axial direction and an elongated tip portion extending in the axial direction from said resilient portion, beyond the end of the probe.

4,978,313

MOVABLE CONNECTOR

Isao Kameyama, Shizuoka, Japan, and Masaaki Yoshizawa, Cologne, Fed. Rep. of Germany, assignors to Yazaki Corporation, Japan

Filed Jul. 14, 1989, Ser. No. 379,882

Claims priority, application Japan, Jul. 15, 1988, 63-93067[U]

Int. Cl.[5] H01R *13/631*

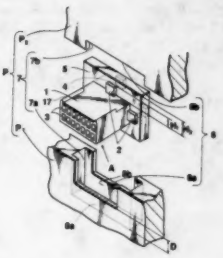
U.S. Cl. 439—248 **12 Claims**

1. A movable connector, comprising:

a first housing adapted to be mounted to an opening of a panel, the panel having a mounting groove formed in an inner edge surface defining the opening;

a second housing engagable with the first housing; and

an elastic rubber member for flexibly supporting the first housing with respect to a panel, the elastic rubber member being provided around the first housing so as to be fitted to the mounting groove of the opening of the panel when



the first housing has been mounted to the opening of the panel through the elastic member.

4,978,314

WATERPROOF PRESS-CONNECTING CONNECTOR

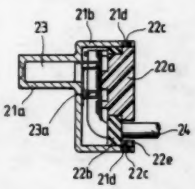
Toshiro Maejima, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,742

Claims priority, application Japan, Nov. 24, 1988, 63-151851[U]; Nov. 24, 1988, 63-151852[U]

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—398 **4 Claims**



1. A press-connecting connector of the waterproof type wherein press-connecting terminals are received respectively in terminal receiving chambers; an open portion is provided at one end portion of each terminal receiving chamber to which an electric wire is to be connected, said open portion being open both in an axial direction of a press-connecting portion and in a direction of the press connection;

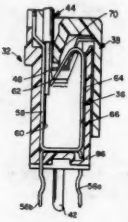
said press-connecting connector comprising: a seal member for closing said open portions in a watertight manner; a cover having a retainer mechanism for retaining said cover on said connector; small holes formed through said seal member so as to pass respectively the electric wires therethrough, each of said small holes being disposed in such a position as to close said press-connecting portion in the axial direction of the press-connecting portion; and slits each extending from an end of said seal member to a respective one of said small holes.

4,978,315

MULTIPLE-CONDUCTOR ELECTRICAL CONNECTOR AND STAMPED AND FORMED CONTACTS FOR USE THEREWITH

Richard R. Edgley, Elmhurst; Frederick J. Gierut, Tinley Park, and William Lenz, Crestwood, all of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Apr. 10, 1990, Ser. No. 506,971
Int. Cl.[5] H01R *4/24*
U.S. Cl. 439—441 13 Claims



1. A multiple-conductor electrical connector adapted for low insertion and high retention forces on a conductor, comprising:

an insulating housing having a cavity; and

a stamped and formed sheet metal contact mounted in the cavity and including an anvil portion at one side of the cavity and a spring finger portion at an opposite side of the cavity, the spring finger portion being inclined in a manner whereby a conductor can be inserted into the cavity between the anvil portion and the spring finger portion with low insertion force and the spring finger portion opposes withdrawal of the conductor from the cavity, the contact having a pair of terminal tails projecting through the housing from said opposite sides of the cavity, the terminal tails being independently severable whereby a selected one of the tails can be disposed in a selected one of a pair of spaced contact lines on the housing and

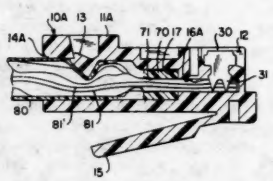
wherein one of said terminal tails is stamped and formed out of the anvil portion of the contact.

4,978,316

ELECTRICAL CONNECTOR

Katsumi Yahata, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 639,182, Aug. 9, 1984, Pat. No. 4,636,024.
This application Jan. 9, 1987, Ser. No. 1,583
Claims priority, application Japan, Feb. 23, 1984, 59-24798
Int. Cl.[5] H01R *13/648*
U.S. Cl. 439—449 21 Claims



7. An electrical connector comprising a housing having a series of individual passageways arranged at a close pitch in a single row for receiving respective discrete wires in a sliding fit and communicating through a divergent wire guiding throat with a common mouth of increased size open at a rear

a series of discrete wires extending from a bundle of wires having leading free ends received in a sliding fit in respective passageways

and trailing portions in the mouth adjacent the throat loaded in wire locating apertures in a wire holder received in a sliding fit in the mouth,

the wire locating aperture being at the same pitch as respective passageways but staggered with adjacent apertures in different rows,

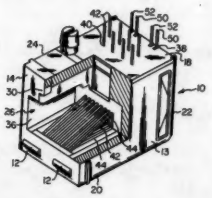
the leading ends of the wires being terminated by terminals entering the respective passageways.

4,978,317

CONNECTOR WITH VISUAL INDICATOR

Alan Pocrass, 15161 Magnolia Blvd., Condo E, Sherman Oaks, Calif. 91403

Filed Mar. 27, 1989, Ser. No. 328,624
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—490 9 Claims



1. An RJ type modular connector for receiving a plug to form an electrical connection in data communication or telecommunication applications comprising:

a housing formed by front, rear, top and bottom walls and having a plug receiving opening formed within the front wall thereof;

at least one light emitting source integrally secured within said housing adjacent the plug receiving opening thereof to provide visual verification of the status of the electrical connection;

a plurality of conductor wires, including conductor wires from said light emitting source, extending through one of said housing walls arranged in a predetermined spaced-apart array, adapted for insertion within a corresponding array of spaced holes in a printed circuit board.

4,978,318

MULTIPLE OUTLET RECEPTACLE AND MOUNTINGS THEREFOR

Roy O. Wiley, Huntington; Donald L. Meath, Shelton, and Glenn L. Murphy, Oxford, all of Conn., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 19, 1989, Ser. No. 340,198
Int. Cl.[5] H01R *13/74, 25/00*
U.S. Cl. 439—536 30 Claims

1. A wiring device adapter plate for mounting to an electrical outlet box an electrical wiring device of the type having contact elements within a housing of molded insulating material, said electrical wiring device being otherwise separately usable for mounting on a surface, which adapter plate comprises:

a major plate portion;

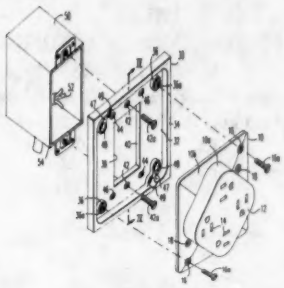
means for facilitating the fastening of the wiring device to the adapter plate;

means for facilitating the fastening of the adapter plate to any of a plurality of electrical outlet box configurations including fastener apertures located for facilitating the fastening of the adapter plate to a single gang outlet box;

said major plate portion having a rim extending around and forward therefrom providing a recess for accommodating

said wiring device with which the adapter plate is to be used;

said major plate portion also having a substantially rectangular opening therein with a rearwardly extending guide



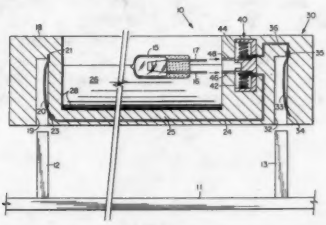
wall that fits within, and facilitates location of the adapter plate with, a single gang outlet box, said substantially rectangular opening being configured to allow wiring from the outlet box to extend through the adapter plate to a wiring device when used therewith.

4,978,319

STRIP MOUNTED ADAPTER SUPPORTING A LAMP AND FEATURING CONDUCTIVE SPADE ENGAGING APPARATUS

Herbert D. Freed, Miami Beach, Fla., assignor to Emmanel Corp., San Antonio, Tex.

Filed May 23, 1989, Ser. No. 355,639
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—638 **11 Claims**



1. In an adapter for lamp installation on a flat stock strip mounting with spades projecting generally perpendicular therefrom, the adapter comprising:

(a) an elongate body having first and second enlargements spaced along said body wherein said enlargements are:

(1) spaced apart sufficiently to receive a lamp therebetween;

(2) each equipped with a receiving slot on a common face thereof for receiving the spades of the flat stock strip;

(3) of sufficient height and width to enable the slot therein to encompass the spade when the spade is inserted into the slot;

(b) current contacting means in each of said slots for contacting the spades when inserted, wherein said current contacting means are arranged to provide current flow between the spades for illumination of the lamp installed in the fixture;

(c) socket means constructed with a pair of openings therein for receiving a pair of current conducting pins on the lamp which are deployed in accordance with an industry standard, and wherein said socket means is constructed with one of said enlargements;

(d) said socket means being positioned in said enlargement to locate the lamp between said enlargements; and

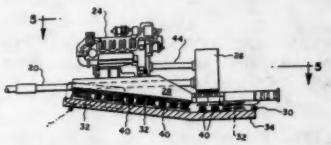
(e) backing means extending between said enlargements and comprising a portion of said body to receive said lamp installed between said enlargements, and wherein said backing means defines the spacing of said enlargements to assure mounting of said enlargements on said spades, and wherein said backing means positions the lamp on installation to provide illumination in a desired direction.

4,978,320

SURFACE EFFECT SHIP ENGINE MOUNT SYSTEM

John B. Chaplin, Covington; Robert G. Moore, and John M. Ryken, both of Slidell, all of La., assignors to Textron Inc., Providence, R.I.

Related U.S. Application Data
Continuation of Ser. No. 55,468, May 28, 1987, abandoned.
Int. Cl.[5] B63H *21/30*
U.S. Cl. 440—052 **18 Claims**



11. In a surface effect ship having a glass fibre main hull structure provided with side hull keels and means for supporting most of the weight of the ship by an air cushion confined under the main hull structure while only the side hull keels are slightly submerged;

a ship propeller driving engine/gearbox arrangement and a platform mounting said arrangement so as to form a sled unit;

resilient means interposed between said sled unit and said main hull structure and elevating the sled unit above the hull structure for minimizing the magnitudes of underwater vibration and acoustic signatures of the ship when it is involved in surveillance operations or the like so as normally to support the weight of the sled unit and mildly restrain it against motion in any direction relative to the hull structure; and

crushable means interposed between said sled unit and said hull structure and normally out of contact with one of them for contact and non-resilient crushing by the other of them in response to vertically directed high energy shock loadings caused by severe mine explosions nearby the ship.

4,978,321

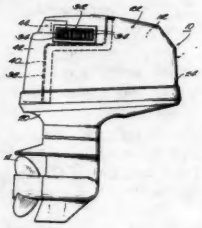
BAFFLED AIR INTAKE SYSTEM FOR OUTBOARD MOTORS

Arthur R. Ferguson, 1620 Ferndale, Northbrook, Ill. 60062

Continuation of Ser. No. 593,285, Mar. 26, 1984, abandoned.
This application Nov. 12, 1985, Ser. No. 797,745
Int. Cl.[5] B63H *21/00*
U.S. Cl. 440—88 **18 Claims**

1. An air intake system for a marine propulsion device including an engine having a top and driving a propeller, said air intake system comprising a cover for enclosing the engine, said cover including a lower pan-like cover member and an upper dome-like cover member sealingly connected to said lower cover member, said upper cover member including an upper portion having a combustion air opening therein, and a baffle including a portion cooperating with said upper cover member to define a downwardly directed duct communicating with said opening, being spaced horizontally from the engine, and extending below the top of the engine, whereby said duct leads air from said opening toward said lower cover member and

clear of the engine so that water entrained in the air is deposited in said lower cover member and is substantially prevented from wetting the engine, and so that combustion air is drawn from the region of said lower cover member to the engine.

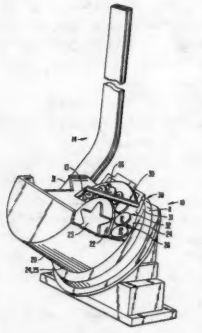


4,978,322

COIN WIPER FOR ESCALATOR HOPPER

Craig Paulsen, Reno, Nev., assignor to International Game Technology, Reno, Nev.

Filed Feb. 13, 1989, Ser. No. 310,562
Int. Cl.[5] G07D *9/06*
U.S. Cl. 453—57 **5 Claims**



1. In a coin dispensing machine of the type having a stationary housing and a rotating pinwheel for dispensing coins, lying on a surface of the pinwheel through an exit opening, a coin wiper comprising:

a resilient member, for performing a corrective function on coins improperly seated on the pinwheel surface;

a stiffening member for holding the resilient member; and

mounting means for mounting the resilient member in the housing at a chosen position overlying the pinwheel surface such that coins on the pinwheel surface contact said resilient member as said coins pass beneath said resilient member before passing to the exit opening, said mounting means including a spring loaded plunger release for releasably mounting a first end of the coin wiper to the coin dispensing machine, and a screw for attaching the second end of the wiper to the coin dispensing machine;

said resilient member adapted to absorb momentum of improperly positioned coins so as to force the improperly positioned coins to lie flatly against the pinwheel surface before passing to the exit opening or to be swept off the pinwheel surface;

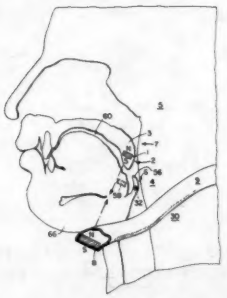
whereby coin jamming in the exit opening is substantially reduced, and wherein unjamming of the coin dispensing machine is facilitated by releasing said first end of the coin wiper from the coin dispensing machine and rotating the coin wiper about the screw in said second end.

4,978,323

SYSTEM AND METHOD FOR PREVENTING CLOSURE OF PASSAGEWAYS

George Freedman, 5 Brook Trail Rd., Wayland, Mass. 01778

Filed Aug. 10, 1989, Ser. No. 392,054
Int. Cl.[5] A61N *2/10*
U.S. Cl. 600—12 **5 Claims**



1. A method for preventing involuntary closure of airway passageways in humans and animals in which the airway consists of tubular walls of tissue wherein at least one region of said wall tissue is relatively soft and movable and an opposite region is relatively rigid, said method comprising the steps of:

(a) disposing a first magnet adjacent said soft region for generating a first magnetic field within said airway;

(b) implanting a second magnet within said soft region of said passageway and nearer said rigid region than said first magnet for generating a second magnetic field which reacts with said first field to exert a force which acts against said soft tissue in a direction away from closure of said airway.

4,978,324

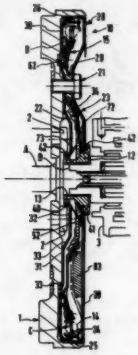
TORSION DAMPING DEVICE WITH PERIPHERAL RESILIENT MEANS, ESPECIALLY FOR AUTOMOTIVE VEHICLES

Pierre Casse, Ermont, France, assignor to VALEO, Paris, France

Filed Feb. 22, 1989, Ser. No. 313,517
Claims priority, application France, Feb. 23, 1988, 88 02143
Int. Cl.[5] F16D *3/12, 47/02*
U.S. Cl. 464—68 **8 Claims**

1. A torsion damping device comprising a support means mounted on a wheel member and forming a support for a torsion damper, first fastening means for securing the wheel member to a first, a hub, means for securing the hub to a second shaft for rotation therewith, said torsion damper having peripherally extending resilient means for coupling the hub with the support means, wherein the device further comprises a sealed casing delimited by transverse walls with the support means constituting one of said transverse walls with the support means constituting one of said transverse walls of the casing, a lubricant fluid filing the casing at least partially, second fastening means securing the casing to the wheel member and being located radially outwardly of said first fastening means and inwardly of said resilient means, spacers being

arranged between said transverse walls and being connected in a sealing manner to said transverse walls, said torsion damper



being carried by and enclosed by said casing and said second fastening means extending through said spacers.

4,978,325

TRIPOD TYPE CONSTANT VELOCITY JOINT

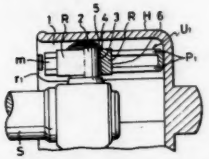
Yasumasa Mizukoshi, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 323,073, Mar. 10, 1989, abandoned, which is a continuation of Ser. No. 129,858, Dec. 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 896,671, Aug. 14, 1986, abandoned. This application Jul. 26, 1989, Ser. No. 386,014

Claims priority, application Japan, Sep. 2, 1985, 60-133065

Int. Cl.[5] F16D *3/205*

U.S. Cl. 464—111 **7 Claims**



1. In a tripod type constant velocity joint comprising:

a housing having three axially extending circumferentially distributed raceways with cylindrical surfaces;

a shaft having three trunnions extending radially separately into said raceways; and

a cylindrical roller coaxially rotatably mounted on each of said trunnions, the improvement comprising;

three U-shaped aligning members, each of which has a pair of circumferentially spaced axially extending arms with cylindrical outer surfaces slidably contacting circumferentially opposed cylindrical surfaces of said raceways, each of said aligning members also having a center section joining the respective arms at one axial end thereof;

the arms of each aligning member having a pair of axially continuous planar inner surfaces in contact with opposite sides of the cylindrical roller that extends into the respective raceway; and

means for holding the aligning members in the housing for limited relative movement with respect to the respective raceway;

the planar inner surfaces of each arm being coplanar with one another and being separated by at least one wide continuous axially extending groove free of mechanical elements.

4,978,326

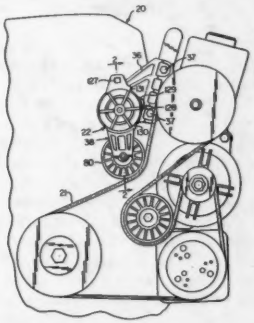
BELT TENSIONER AND METHOD OF MAKING THE SAME

Dewey D. Henderson, Springfield, Mo., assignor to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 450,352, Dec. 13, 1989, Pat. No. 4,952,197, which is a division of Ser. No. 395,112, Aug. 17, 1989, Pat. No. 4,908,007, which is a division of Ser. No. 276,084, Nov. 23, 1988, Pat. No. 4,886,483. This application Apr. 24, 1990, Ser. No. 513,704

Int. Cl.[5] F16H *7/12*

U.S. Cl. 474—135 **20 Claims**



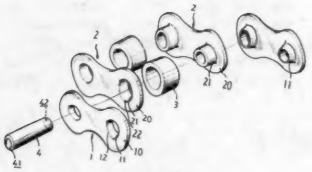
1. In a tensioner for a power transmission belt that is adapted to be operated in an endless path, said tensioner comprising a support means for being fixed relative to said belt, a belt engaging means carried by said support means and being movable relative thereto, first spring means operatively associated with said support means and said belt engaging means for urging said belt engaging means relative to said support means and against said belt with a force to tension said belt, and frictional dampening means operatively associated with said support means and said belt engaging means to dampen the movement of said belt engaging means relative to said support means in at least one direction of movement thereof, of said dampening means having a longitudinal axis, said support means comprising a shaft means having a longitudinal axis and being fixed from movement relative to said belt engaging means, said belt engaging means having a portion thereof being rotatably carried by said shaft means so as to rotate relative to said shaft means, said dampening means comprising a pair of frictionally engaging first and second parts with said first part comprising an annular pad of friction material that is coaxially disposed and axially movable on said shaft means relative to said second part, second spring means urging said first part against said second part with a certain spring force, said first part of said dampening means having guide means thereon, said one of said support means and said belt engaging means having opening means therein that receive said guide means therein from one side thereof to guide axial movement of said first part, and a bearing member having bearing means disposed in said opening means and receiving said guide means therein, the improvement wherein said bearing member has said bearing means thereof disposed in said opening means from the other side of said one of said support means and said belt engaging means and wherein said shaft means is integral with said support means whereby said support means and said shaft means comprise a one-piece homogeneous member.

4,978,327

COUPLING PORTION OF A CHAIN

Chin L. Wu, No. 734, Chung Shan Rd., Kwei Jen Hsiang, Tainan Hsien, Taiwan

Filed Apr. 4, 1990, Ser. No. 504,573
Int. Cl.[5] F16G 13/02
U.S. Cl. 474—228 1 Claim



1. A coupling portion of a chain, said chain comprising a plurality pairs of inner sheets and a plurality pairs of outer sheets alternatively coupled together; each said inner sheet having two first rings integrally formed together, a first annular flange being formed on a center of each said first ring and being substantially perpendicular to said inner sheet; each said outer sheet having two second rings integrally formed together, a second annular flange being formed on a center of each said second ring and being substantially perpendicular to said outer sheet, a width of each said second annular flange being gradually decreased toward a free edge thereof; an inner surface of an opposite end to a free edge of each said first annular flange being rounded so as to form a first recess, and an inner surface of an opposite end to said free edge of each said second annular flange being rounded so as to form a second recess; a pair of rollers being rotatably supported between each pair of said inner sheets around said first annular flanges of said inner sheets; each said second annular flange of said outer sheet being received and engaged in a respective first recess; a pin having a depression formed in each end thereof, said pin being inserted through a pair of said first annular flanges and a respective pair of said second annular flanges which are aligned, both ends of said pin being deformed so as to be enlarged and engaged in said second recesses and being substantially embedded in said outer sheets so that said outer sheets have a flat outer surface without protrusions.

4,978,328

AUTOMATIC TRANSAXLE ASSEMBLY FOR AN AUTOMOTIVE VEHICLE DRIVELINE

Stanley L. Pierce, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

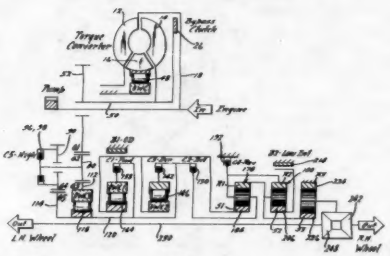
Filed Sep. 25, 1989, Ser. No. 412,232
Int. Cl.[5] F16H 37/08
U.S. Cl. 475—66 10 Claims

1. A transaxle assembly having a hydrokinetic unit with a turbine and an impeller located on a first axis, a multiple ratio planetary gear assembly located on a second axis, said axes being in spaced relationship:

a multiple ratio torque transfer drive having external gears of different pitch diameters mounted on a third axis intermediate said first and second axes, said transfer drive including;

a drive gear connected to said turbine and in engagement with one of said external gears;

driven gear means connected to the other of external gears, and selectively engageable clutch means for establishing and disestablishing each of two torque flow paths whereby the ratios that are established by said planetary



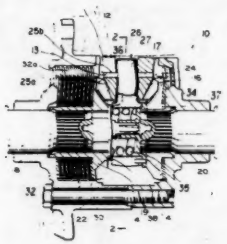
gear assembly are complemented by the ratios of said external gears.

4,978,329

LIMITED SLIP DIFFERENTIAL

Yasuyoshi Yasui, and Norihisa Iguchi, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Dec. 8, 1988, Ser. No. 281,345
Claims priority, application Japan, Dec. 8, 1987, 62-186843[U]; Mar. 14, 1988, 63-32670[U]
Int. Cl.[5] F16H 1/44
U.S. Cl. 475—84 7 Claims



1. A limited slip differential comprising:

a differential case;

a pair of side gears formed of spiral bevel gears and disposed in said differential case;

a plurality of pinions formed of spiral bevel gears meshing with the side gears, supported by portions of a spider and disposed in said differential case;

frictional force generating means by which a differential motion generated between a pair of shafts respectively coupled with said side gears is limited; and

means for preventing said spider and/or gears from wear resulting from such constitution of the side gears and pinion gears that the tooth surfaces on which each of the pinion meshes with said pair of side gears constitute a concave with respect to the tooth of the side gear on the side and a convex with respect to the tooth of the side gear on the other side,

wherein said wear preventing means is a member for preventing each of the pinions from obtaining in a plane including points of contact between the pinion concerned and said pair of side gears and axes of said pair of shafts and is disposed between said pinion concerned and said differential case, each said member having an inner surface formed as a plane and an outer surface which is

formed as a surface having an arc centering around axes of the paired shafts and ranging the arc axially;

wherein said differential case has an inner surface opposed to the outer surface of said member, the inner surface of the differential case being formed as a surface having an arc centering around axes of the pair of shafts and ranging the arc axially, and

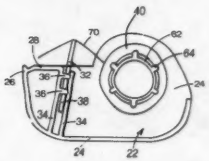
wherein radii of the arcs of said members are substantially equal to one another and to that of the arc of said inner surface of said differential case.

4,978,330

TAB FORMING TAPE DISPENSER WITH TAPE PASSING OVER CUTTER

Robert N. Suhr, 431 Chowning Pl., NW., Marietta, Ga. 30064

Filed Jul. 31, 1989, Ser. No. 386,782
Int. Cl.[5] B26F 3/02
U.S. Cl. 493—466 1 Claim



1. An apparatus for forming a tab on the end portion of outstretched tape on a tape dispenser, comprising:

(a) a base;

(b) a support holder on said base adapted to hold a roll of adhesive type tape;

(c) a cutter edge on said base;

(d) said cutter edge so located that outstretched tape from said roll will pass over the said cutter with the adhesive side of said tape facing down and in contact with said cutter;

(e) a raisable lifting member mounted on said base, located between said roll and said cutter edge and under said outstretched tape;

(f) ribs attached to said base so that said lifting member is guided in a direction generally perpendicular to said outstretched tape;

(g) said lifting member composed of two portions so when said lifting member is raised the first portion of said member is in contact with the said outstretched tape and the second portion of said member creates an opening under the said tape;

(h) said lifting member when raised lifts the outstretched tape so the operator can force the said tape downwardly and rearwardly under the said first portion of said lifting member in contact with said tape to cause two areas of said adhesive surface of said tape to be pinched together in the said opening created by said second portion of said lifting member creating said tab, and so that said tab can be removed by twisting it out of contact with said first portion of said lifting member sand removed from said opening.

4,978,331

METHOD AND APPARATUS FOR CLEANING IN PLACE OF A DECANTER CENTRIFUGE

Joseph F. Luchetta, Doylestown, and Louis C. Eberle, Warminster, both of Pa., assignors to Alfa-Laval AB, Stockholm, Sweden

Filed Jul. 11, 1989, Ser. No. 377,980
Int. Cl.[5] B04B 15/06, 9/00
U.S. Cl. 494—37 14 Claims

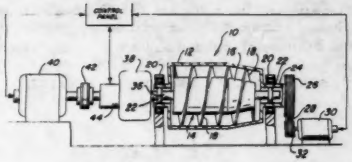
12. A method of cleaning a centrifuge in place, the centrifuge having a bowl formed about a generally horizontal axis and having a screw conveyor disposed coaxially therein, comprising the steps of:

emptying the bowl of process material;

introducing a cleaning liquid into the bowl;

engaging the conveyor and the bowl to the conveyor drive motor;

simultaneously rotating the conveyor and the bowl and the cleaning liquid therewith for a substantial period of time



to impose upon the cleaning liquid by rotation a centrifugal force which is approximately equal to or less than the gravitational force on the cleaning liquid, whereby the screw conveyor and the interior of the bowl are cleaned by the agitating and tumbling action of the cleaning liquid;

disengaging the drive motor from the bowl; and

rotating the conveyor in a direction reverse of the initial direction of rotation to remove the material cleaned from the sides of the bowl and the conveyor.

4,978,332

TREATMENTS EMPLOYING VASOCONSTRICTIVE SUBSTANCES IN COMBINATION WITH CYTOTOXIC AGENTS FOR INTRODUCTION INTO CELLULAR LESION AREAS

Edward E. Luck, and Dennis M. Brown, both of Menlo Park, Calif., assignors to Matrix Pharmaceutical, Inc., Menlo Park, Calif.

Filed Sep. 28, 1987, Ser. No. 101,599
The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.
Int. Cl.[5] A61N 1/30
U.S. Cl. 604—19 20 Claims

1. A method for treating a neoplastic lesion or surrounding tissue which comprises:

applying at the site of said length a composition consisting essentially of a uniformly dispersed vasoconstrictive drug and at least one uniformly dispersed cytotoxic drug in a non-proteinaceous aqueous medium;

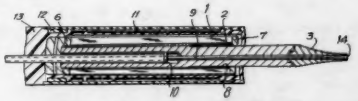
whereby said drug is retained in the immediate environment avoiding significant levels of the drug at sites distant from the site of introduction.

4,978,333

RESONATOR FOR SURGICAL HANDPIECE

Alan Broadwin, Brooklyn, N.Y., and Claus Kleesattel, San Jose, Costa Rica, assignors to Valleylab, Inc., Boulder, Colo.

Filed Dec. 20, 1988, Ser. No. 287,749
Int. Cl.[5] A61M 1/00
U.S. Cl. 604—22 6 Claims



1. An ultrasonic resonant vibrator comprising a resonant member having a proximal end and a distal end and an ultrasonic vibration magnetostrictive transducer for generating

ultrasonic vibrations which are transmitted from said transducer to said resonant member, wherein said transducer comprises a plurality of elongated strips of magnetostrictive material, each strip having a proximal end, a distal end and a substantially V-shaped cross section, wherein each arm of the V-shaped cross section is formed by the longitudinal length of each of said strips, each arm of each of said strips being attached along the radial length of each arm to each arm of each adjacent one said strips only at both the proximal end and the distal end to form an integral substantially rigid column having a central axis with fins extending radially relative to said axis, wherein said column defines a central tunnel with a proximal end and a distal end centered along said central axis, wherein at least part of said resonant member is located within said tunnel and is attached at its said proximal end to the proximal end of said tunnel.

4,978,334

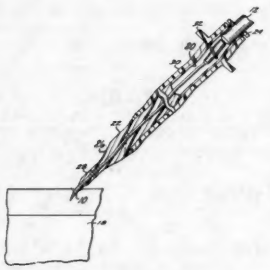
APPARATUS AND METHOD FOR PROVIDING PASSAGE INTO BODY VISCUS

Frederic J. Toye, 718 A James St., and James D. Weinstein, 1109 Woodland Dr., both of Bridgeport, W. Va. 26330

Filed Sep. 8, 1988, Ser. No. 241,948

Int. Cl.[5] A61M 5/00

U.S. Cl. 604—51 1 Claim



1. A percutaneous non-dissection method for providing a passage into a body cavity, the method comprising the steps of:

locating a hollow needle and attached syringe within an elongated flexible dilator, with the needle slidably disposed through and extending out of a central bore of the dilator;

locating the dilator and needle in coaxial relationship to the cylinder interior of a tube;

forming a passage into the body cavity by insertion of the needle and the distal extremity of the dilator into the cavity;

operating the syringe to withdraw air from the cavity to establish penetration of the cavity by the needle;

slidably withdrawing the needle and syringe from the dilator;

urging the dilator and the distal extremity of the tube into the cavity along the passage defined by the needle and the distal extremity of the dilator; and

slidably withdrawing the dilator from the tube.

4,978,335

INFUSION PUMP WITH BAR CODE INPUT TO COMPUTER

William D. Arthur, III, Apharetta, Ga., assignor to Medex, Inc., Hilliard, Ohio

Filed Sep. 29, 1989, Ser. No. 414,371

Int. Cl.[5] A61M 5/20

U.S. Cl. 604—67 2 Claims

1. An infusion pump comprising:

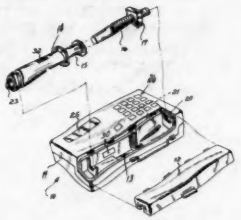
a housing,

mounting means on said housing for a syringe having a plunger,

means including a motor connected to said plunger for driving said plunger at a preselected rate,

a computer connected to said motor for controlling the operation of said plunger,

said computer being capable of receiving data relating to a patient's dosage requirements and converting that data to an output that controls said motor to drive said plunger in accordance with received data,



a reader for machine-readable computer data connected to said computer,

a syringe having a plunger and having machine-readable data mounted on the syringe and containing data relating to a patient's dosage requirement,

said reader, upon reading said data, controlling the operation of said motor and hence the dispensing of medicant in said syringe, said syringe being mounted by said mounting means to enable said reader to read said data and program said computer for a particular patient's requirements.

4,978,336

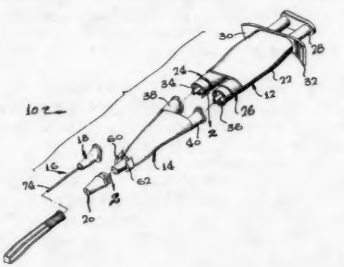
BIOLOGICAL SYRINGE SYSTEM

Emil E. Capozzi, Costa Mesa, and H. Stephen Cookston, Pacific Palisades, both of Calif., assignors to Hemaedics, Inc., Malibu, Calif.

Continuation of Ser. No. 102,543, Sep. 29, 1987, abandoned. This application Oct. 3, 1989, Ser. No. 418,707

Int. Cl.[5] A61M 37/00

U.S. Cl. 604—82 4 Claims



1. A biological syringe system for delivering a first and second fluid in a mixed composition said biological syringe system including a first and second syringe for holding said first and second fluids, and a corresponding first and second plunger for forcing said first and second fluids from said first and second syringes respectively, comprising:

a manifold, said manifold having first and second corresponding component channels therethrough, and first and second input connections respectively communicating with said first and second component channels, said first and second component channels terminating in corre-

sponding exit channels adjacent to each other on an opposing end of said manifold;

a discharge assembly coupled to said opposing end of said manifold and receiving fluid from both of said exit channels, said discharge assembly for mixing fluid from both of said exit channels and delivering said mixed fluid in a spray, said discharge assembly having a first and second passage therethrough communicating with said exit channels from said manifold for carrying fluid from said first and second component channels in corresponding first and second passages within said discharge assembly while maintaining said first and second fluids separated from each other, said discharge assembly having a mixing space defined therein to receive separate flows from said passages, said discharge assembly further comprising mixing means disposed within said mixing space to thoroughly mix said first and second fluids for the first time within said mixing space and to immediately thereafter atomize said thoroughly mixed first and second fluids in a spray discharged from said discharge assembly.

4,978,337

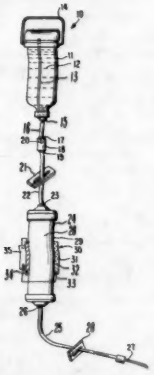
FORMULATION CHAMBER WITH EXTERIOR ELECTROTRANSPORT DELIVERY DEVICE

Felix Theeuwes, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Sep. 8, 1988, Ser. No. 241,662

Int. Cl.[5] A61M 5/14

U.S. Cl. 604—85 **36 Claims**



1. In a drug delivery apparatus comprising a fluid reservoir and means connected thereto for conveying a beneficial drug to a recipient, the improvement in the drug delivery apparatus, comprising:

(a) a formulation chamber comprising:

(1) an inlet connected to said conveying means for letting fluid into the chamber;

(2) an outlet connected to said conveying means for letting fluid leave the chamber;

(3) a wall that surrounds the chamber, with the improvement comprising means in the wall for letting an ionized drug pass through the wall; and

(b) an electrotransport device positioned on the outside of the wall for providing a drug to the means for letting drug pass through the wall, the electrotransport device comprising:

(4) a housing that surrounds an internal space;

(5) a pair of electrodes in spaced relation disposed within the device; and,

(6) a beneficial drug in the device initially present between the electrodes.

4,978,338

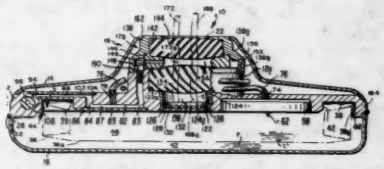
IMPLANTABLE INFUSION APPARATUS

Gerald S. Melsky, Lexington, and Frank R. Prosl, Duxbury, both of Mass., assignors to Therex Corp., Walpole, Mass.

Filed Jun. 20, 1988, Ser. No. 184,244

Int. Cl.[5] A61M 5/00

U.S. Cl. 604—93 **45 Claims**



1. Implantable infusion apparatus comprising

a hermetically sealed housing, said housing including a pronounced outwardly projecting promontory positioned at or near the center of the housing away from the periphery thereof;

a passage into said housing at said promontory;

needle stop means at the end of said passage inside said housing;

a first needle-penetrable, self-sealing septum mounted in said passage at a selected spacing from said needle stop means, said first septum being located at the outer surface of said housing at the top of said promontory;

a second septum mounted in said passage at a selected spacing from said first septum thereby to divide said passage into a first segment extending between said needle stop means and said first septum and a second aligned segment extending between said first septum and said second septum;

first and second fluid outlets from said first and second passage segments;

a pumpable infusate reservoir inside said housing in fluid communication with one of said fluid outlets, the other of said fluid outlets being in fluid communication with fluid flow means extending within said housing;

a catheter extending from the housing for conducting fluid from said apparatus to an infusion site; and

a conduit in said housing for conducting fluid from said reservoir to said catheter.

4,978,339

NON-REUSABLE SYRINGE

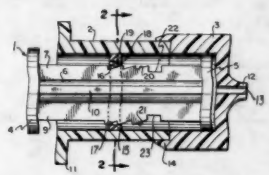
Joseph Labouze, 53, Bld. d'Andilly, Soisy/Montmorency, France 95230, and Pierre Teboul, 4, Av. Aristide Briand, Domont, France 95330

Filed Aug. 1, 1989, Ser. No. 388,166

Claims priority, application France, Aug. 1, 1988, 88 10368

Int. Cl.[5] A61M 5/00

U.S. Cl. 604—110 **9 Claims**



1. A non-reusable syringe comprising:

a hollow syringe body having a first end to which the cannula is to be attached and a second end,

a piston for insertion into the body second end and for travel

within said body, the piston having a longitudinally extending stem with a pair of spaced apart radially extending ribs, each of said ribs having on its outer edge a ratchet tooth profile, the profile of the teeth on each rib extending in the opposite direction,

means within the body forming a pair of slots at a position corresponding to the pair of spaced ribs of the stem, one of said slots having a stop means for engaging the teeth of a rib profile and the other slot permitting free passage of the rib profile,

movement of the piston in a direction from the first end toward the second end of the body to a predetermined first position being permitted with the teeth of the profile of one rib passing over the stop, and

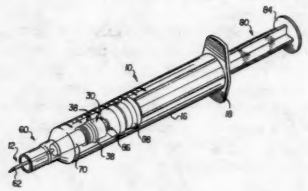
means within the body cooperating with the stem in said first position permitting rotation of the stem to change the positions of the ribs relative to their locations in the slots, movement of the piston from the predetermined first position toward the body first end permitted with the teeth of the profile of the other rib passing over the stop, and retraction of the piston from the body first end toward the second end prevented by the teeth of the profile of said other rib engaging the stop within the body.

4,978,340

SYRINGE WITH RETRACTABLE NEEDLE

Richard C. Terrill, Hurst; Fred A. Allgood, Fort Worth, and John A. Cunningham, Garland, all of Tex., assignors to Alteron Incorporated

Filed Jun. 15, 1988, Ser. No. 207,265
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—195 **15 Claims**



1. A syringe apparatus comprising:

(a) a wall defining a syringe body having a passageway therethrough having a distal end and a proximal end;

(b) a needle engaging means positioned at the distal end for attaching a needle to the syringe body;

(c) a carrier engaging means on said syringe body adjacent to said needle engaging means for holding a retractable needle carrier, said needle engaging means and said carrier engaging means rotatably engage the needle and needle carrier in opposite directions of rotation;

(d) a needle carrier retractably engaging said carrier engaging means comprising:

(i) a carrier wall defining a passageway therethrough having a distal end and a proximal end;

(ii) syringe body engaging means on the outer wall of said needle carrier for engaging the carrier engaging means of said syringe body;

(iii) plunger engaging means located at the proximal end of said needle carrier for engaging a plunger such that the needle carrier means may be retracted into the syringe body upon manipulation of the plunger;

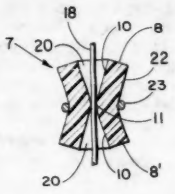
(iv) needle engaging surface on the distal end of said needle carrier for engaging the needle.

4,978,341

INTRODUCER VALVE FOR A CATHETER ARRANGEMENT

Werner Niederhauser, Zurich, Switzerland, assignor to Schneider Europe, Zurich, Switzerland

Filed Apr. 6, 1989, Ser. No. 334,626
Claims priority, application Switzerland, Apr. 7, 1988, 1278/88
Int. Cl.[5] A61M *29/02*
U.S. Cl. 604—167 **2 Claims**



1. An introducer valve body, for use within a connecting housing having a longitudinal passageway, for sealing the passageway and for sealing an elongated guidewire or catheter element which may be inserted within the passageway, comprising:

a generally cylindrical elastomeric body having a proximal end, a distal end, a central axis and a central longitudinal opening therein, and further comprising an elastomeric ring which circumscribes the valve body to facilitate the sealing of the valve;

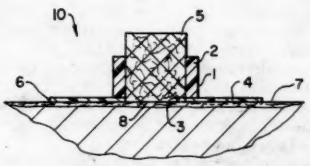
said opening having a proximal aperture tapering inwardly to the central axis and having a distal aperture tapering inwardly to the central axis, and adapted to receive the elongated element, and wherein the exterior surface of the body tapers inwardly from said proximal end and tapers inwardly from said distal end generally parallel respectively with said proximal and distal apertures.

4,978,342

EXUDATE-ABSORPTIVE, ADHESIVE-BACKED DERMAL PATCH FOR USE WHILE COLLECTING A BLOOD SAMPLE

Ken Heimreid, Jupiter Ring 41D, N-3942 Skjelsvik, Norway

PCT No. PCT/NO88/00013, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06427, PCT Pub. Date Sep. 7, 1988
PCT Filed Feb. 17, 1988, Ser. No. 265,793
Claims priority, application Norway, Feb. 24, 1987, 870737
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—180 **1 Claim**



1. A prepared bandage for use while collecting a blood sample from an animate subject using a transcutaneous cannula,

said bandage comprising:

an adhesive-backed strip arranged to be stuck onto the skin of the subject, said strip having means defining an

opening therethrough for surrounding a site where a blood sample is to be taken;

an annular, upstanding collar secured on said strip surrounding said opening so that an inner peripheral surface of said strip surrounding said opening and an inner peripheral surface of said collar, provide a sump, bottomed, in use, by the subject's skin;

a plug made of absorptive material capable of absorbing liquid exudate expected from puncturing the skin and subcutaneous tissue for taking venous blood from the subject, said plug being received in said sump and engaged by said inner peripheral surface of said collar so as to be retained in said sump.

4,978,343

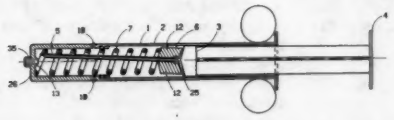
TRAP IN BARREL ONE HANDED RETRACTABLE SAFETY SYRINGE

Edward D. Dysarz, 11423 Triola La., Houston, Tex. 77072, and Derek R. Van Gilder, 7906 Quail Meadow Dr., Houston, Tex. 77071

Continuation-in-part of Ser. No. 466,722, Jan. 16, 1990. This application Mar. 6, 1990, Ser. No. 488,613

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—195 **6 Claims**



1. A syringe held by fingers and thumb for injecting medicament or fluid into a body or part of a body comprising:

an elongated hollow barrel having a first end and a second end, and having an inner surface and an outer surface and further having a longitudinal axis in the center of the said elongated hollow barrel, parallel in most part of the said inner surface and said outer surface of the said elongated hollow barrel further extending from said first end to said second end of said elongated hollow barrel;

a slidable plunger assembly inside of said elongated hollow barrel, said slidable plunger assembly having a first end and a second end and further having a plunger piston at said first end and a thumb flat at said second end wherein a thumb or finger pushes on said thumb flat in a direction toward said first end;

a slidable piston inside of said elongated hollow barrel, said slidable piston having a first end and a second end and said first end of said slidable piston is nearer said first end of said elongated hollow barrel;

a pimple fixed to said second end of said slidable piston;

a needle cannula having a first end and a second end, said first end of said needle cannula extends past said first end of said elongated hollow barrel and said second end of said needle cannula is fixed to said first end of said slidable piston;

a spring means having a first end and a second end, said first end of said spring means is integral with said first end of said elongated hollow barrel and said second end of said spring means is integral with said slidable piston, said spring means is further compressed between said first end of said elongated hollow barrel and said slidable piston;

at least one trigger notch formed into said slidable piston assembly, said trigger notch further having at least, a first side and a second side, said first side is near perpendicular to said longitudinal axis of said elongated hollow barrel and said first side is nearer to said first end of said slidable piston and said second side of said trigger notch is a trigger notch slope wherein said trigger notch slope is near to said first side of said trigger notch and slopes away from said first side in the direction of said second end of said slidable piston;

a barrel flange fixed to said first end of said elongated hollow barrel;

an inner rim fixed to said barrel flange;

a needle cannula tunnel in said barrel flange and said inter rim;

at least one slidable trigger, having a first end and a second end, said slidable trigger is held in place within said trigger guide wherein said first end of said slidable trigger is located near the outer surface of said elongated hollow barrel and said slidable trigger further extends past said trigger guide and engages said trigger notch formed into said slidable piston, said second end of said slidable trigger having a slope similar to said trigger notch slope and wherein the said thumb flat of the said slidable plunger assembly is pushed by said finger or thumb and further pushes said plunger into the second end of the said slidable piston further pushing said slidable piston, thereby further compressing the said spring means and further causing the said trigger notch slope to further push on the slope of the said slidable trigger, further causing the said slidable trigger to slide in a direction away from the said longitudinal axis of the said elongated hollow barrel and wherein said sliding trigger no longer engages the said trigger notch and wherein said finger or thumb is further removed from the said thumb flat thus allowing the said spring means to push on the slidable piston which will further push on the slidable plunger assembly thus forcing the needle cannula to move into the first end of the said elongated hollow barrel wherein said pimple on said slidable piston will further thrust into said slidable plunger assembly causing said slidable piston and said needle cannula to slope relative to said longitudinal axis further pointing the tip of said needle cannula away from said needle cannula tunnel completely enclosing said needle cannula within said elongated hollow barrel, said barrel flange and said inner rim wherein said needle cannula cannot be accidentally pushed out of said elongated hollow barrel thus preventing the said needle cannula from accidentally pricking or injuring others.

4,978,344

NEEDLE AND CATHETER ASSEMBLY

Mitchell P. Dombrowski, 103 Mapleton, Grosse Point Farms, Mich. 48236, and Robert A. Welch, 9573 Winterset Cir., Plymouth, Mich. 48170

Continuation-in-part of Ser. No. 231,053, Aug. 11, 1988, abandoned. This application Dec. 27, 1988, Ser. No. 269,784

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—198 **22 Claims**

1. A disposable needle assembly (10) comprising: a catheter assembly including a passageway therethrough; first hub means (16) defining proximal and distal ends thereof for connecting said needle assembly (10) to a fluid conduit, said first hub means (16) including a passageway (24) extending therethrough; a hollow needle portion (28) in fluid communication with said passageway (24) and including a distal tip (32) which

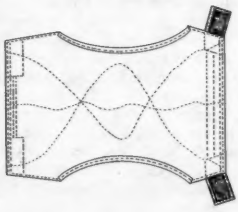
is distal relative to said first hub means (16); cap means (34), including tether means (50,50',50'') for connecting said cap means (34) to said first hub means (16) and limiting the extent that said cap means (34) can be extended from said first hub means (16), and locking means for locking said cap means (34) over said distal tip (32) when said tether means (50,50',50'') is completely extended, said cap means having a neutral position along said needle portion (28) proximate to said first hub means (16) for exposing a length of said needle portion (28) and an extended position for capping said distal tip (32), said assembly characterized by said cap means (34) including releasable securing means for positively securing said cap means (34) with said catheter assembly as said needle portion (28) is disposed within said passageway of said catheter assembly and releasing said cap means (34) from said catheter assembly when said cap means are moved to said extended position whereby removal of said needle portion (28) from said passageway of the catheter assembly moves said cap means (34) relative to said needle portion to said extended position capping said distal tip (32) as said cap means (34) is unseated from said catheter assembly.

4,978,345

REUSABLE MULTI-LAYERED DIAPER

Craig S. Holliday, and Deborah A. Holliday, both of 3990 Washington Way, Morrow, Ohio 45152

Filed Aug. 28, 1989, Ser. No. 399,726
Int. Cl.[5] A61F *13/15*
U.S. Cl. 604—384 **3 Claims**



1. A multi-layer, reusable, washable diaper for an infant comprising a substantially 100% natural cotton facing sheet for contacting the skin of the infant; at least one sheet of absorbent fibrous batt material for drawing and retaining moisture away from the skin of the infant; a flexible liquid impermeable material sheet; and a decorative outer covering; said sheets secured together in a generally rectangular shape with concavely curved longer edges and generally linear shorter edges defining a front waist area, a back waist area, front and back crotch areas intermediate the waist areas, and leg areas, said waist areas having fastening means for securing the diaper in place on the infant and adapted to be positioned out of the sight and easy reach of the infant, including wing portions extending outwardly from the corners of said front waist area and corresponding elongated portions extending longitudinally along said back waist area, said wing portions and said corresponding elongated portions fastening together along said back waist area.

4,978,346

LASER THERMAL PROBE

Joseph R. Bentley, Holladay, Utah, assignor to HGM Medical Laser Systems, Inc., Salt Lake City, Utah

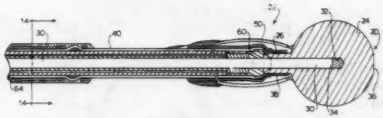
Filed Aug. 11, 1989, Ser. No. 392,467
Int. Cl.[5] A61B *17/36*; A61F *7/00*
U.S. Cl. 606—27 **12 Claims**

1. A laser-energizable thermal probe assembly for medical treatment comprising:

(a) an optical fiber extending between distal and proximal ends and having a fiber jacket formed thereon;

(b) a thermally conductive probe body having a curvoidal tip, a neck portion joined to said tip and extending proximally therefrom and an interior passage in said probe body extending through said neck portion, the distal end of said optical fiber being mounted in said passage enabling laser energy from a laser energy source coupled to the proximal end of the optical fiber to be transmitted by the optical fiber to the probe body and converted to thermal energy to be transmitted by the tip to a selected treatment site in contact with the tip;

(c) a plurality of spines positioned parallel with each other and with the optical fiber and spaced apart around the optical fiber, each spine having a distal end, a central spine area and a proximal spine area, said distal spine ends being



attached to the neck portion of the probe body and said spines extending proximally therefrom for a length substantially longer than the length of said neck portion and along and adjacent a distal portion of the optical fiber;

(d) a plurality of thermally conductive parallel wires wound in a series of helical turns around the probe body neck portion and around the distal end, central and proximal spine areas of said spines and around said optical fiber distal portion, said helical turns extending from the probe body neck portion to the proximal spine areas and being secured at selected locations to the spines; and

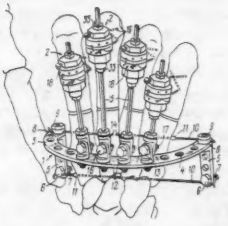
(e) securing means operative to secure the spines, wires and optical fiber together.

4,978,347

DISTRACTION APPARATUS FOR OSTEOSYNTHESIS OF SHORT TUBULAR BONES

Gavrill A. Ilizarov, ulitsa Klimova, 41, kv. 38, Kurgan, U.S.S.R.

PCT No. PCT/SU88/00152, § 371 Date Mar. 20, 1990, § 102(e) Date Mar. 20, 1990, PCT Pub. No. WO90/00883, PCT Pub. Date Feb. 8, 1990
PCT Filed Jul. 26, 1988, Ser. No. 490,628
Int. Cl.[5] A61F *5/04*
U.S. Cl. 606—54 **6 Claims**



1. A distraction apparatus for osteosynthesis of short tubular bones, comprising a support unit (1) made as a cramp-shaped plate (3) provided with a plurality of perforations (4) and with two fixing pins (10) secured in between arms of the cramp-shaped plate, distraction units (2) comprising a pin holder (18) and at least two distraction pins (19) installed in said holder, and distraction threaded rods (15) whose proximal ends are connected to the support unit (1), characterized in that the fixing pins (10) of the support unit (1) are arranged parallel to

each other and lie in a plane square with the planes of the cramp-shaped plate (3), while each of the distraction units (2) is located on one of the distraction rods (15) with a possibility of relative motion lengthwise its longitudinal axis, each of the distraction threaded rods (15) being situated on the cramp-shaped plate (3) with a possibility of angular motion, and the distraction pins (19) of each distraction unit (2) are cantileverly fixed in the pin holder.

4,978,348

COMPRESSION-DISTRACTION APPARATUS FOR OSTEOSYNTHESIS

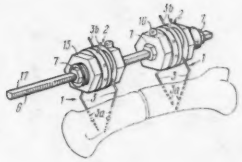
Gavriil A. Ilizarov, ulitsa Klimova, 41, kv. 38., Kurgan, U.S.S.R.

PCT No. PCT/SU88/00131, § 371 Date Feb. 8, 1990, § 102(e) Date Feb. 8, 1990, PCT Pub. No. WO89/11254, PCT Pub. Date Nov. 30, 1989

PCT Filed May 26, 1988, Ser. No. 460,906

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—57 **17 Claims**



1. A compression-distraction apparatus for osteosynthesis, comprising at least two support units (1), each incorporating at least two fixing pins (3), one of whose arms (3*a*) crossing over in the bone, while other arms (3*b*) are secured in pin holders (2) made as a bolt (4) carrying a set of plates (8) having open slots (10) to accept the fixing pins (3), and a stack of spacer shims (9), the pin holders being fitted on a main threaded rod (6) traversably lengthwise the axis thereof and fixable with the aid of nuts (7), characterized in that the bolt (4) of the pin holder (2) has an axial hole (5) through which the main threaded rod (6) is free to pass, the plates (8) and spacer shims (9) are shaped as washers mounted on the bolt (4) rotatably about its axis and fixable by a clamping nut (13), the open slots (10) to receive the fixing pins (3) are provided on end surfaces of the plates (8) and pass along the chord of their circumference on a far side of the hole (12) in the washer, while the nuts (7) fitted on the main threaded rod (6) are situated on both sides of the bolt ends, and the fixing pins (3) are curved and locked in the pin holder (2) in a criss-cross fashion.

4,978,349

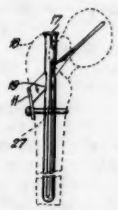
FIXATION PLATE

Robert Frigg, Wayne, Pa., assignor to Synthes (U.S.A.), Paoli, Pa.

Filed Aug. 3, 1989, Ser. No. 388,848

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—67 **8 Claims**



1. An assembly for use in osteosynthesis, said assembly comprising an intramedullary nail for insertion into the medulla of a femur and a fixation device, said fixation device having a retaining plate for positioning along the outside surface of the shank of the femur and a helically twisted blade extending from said plate for insertion into the head of the femur, and said nail having a through slot to receive and support the blade of said fixation device, while permitting movement of said blade relative to said nail, said nail and the retaining plate of said fixation device having cooperating apertures for receiving retaining means extending through the aperture of said plate, through the bone and into the aperture of said nail.

4,978,350

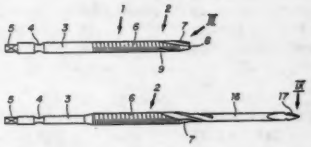
TRANSCUTANEOUS PIN FOR FIXATION OF A BONE PART OR FRAGMENT

Marcel H. Wagenknecht, Le Lignon, Switzerland, assignor to Jaquet Orthopédie S.A., Geneva, Switzerland

Continuation of Ser. No. 147,039, Jan. 20, 1988, abandoned, which is a continuation of Ser. No. 935,415, Nov. 26, 1986, abandoned. This application Jan. 23, 1990, Ser. No. 467,289

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—72 **13 Claims**



1. A transcutaneous pin having a centerline and a tap, said pin for fixation of a bone part or fragment and said pin having a tap comprising a threaded portion with at least one flute at the anterior end of the threaded portion adapted to perform a tapping operation when said anterior end of the threaded portion penetrates the bone part or fragment, with the at least one flute each taking the form of a notch creating a cutting edge of the tap across the thread, and a clearance relief being provided behind the cutting edge of the tap which approaches the centerline of the pin until it reaches the following notch, thereby forming a clearance angle, wherein said at least one flute is disposed helicoidally in relation to the axis of the thread, with the helix and the thread being pitched in the same direction.

4,978,351

GUIDING INSTRUMENT TO PIERCE THE BONE CORTICAL, AUXILIARY IN THE LOCATION OF THE HOLES FOR INTRA-MARROW PINS

Fernando C. Rozas, 112 Colina Rumorosa Street, Bulevares, Naucalpan, Mexico

Filed Apr. 19, 1989, Ser. No. 340,232

Claims priority, application Mexico, Sep. 28, 1988, 13200

Int. Cl.[5] A61B *17/56*

U.S. Cl. 606—98 **19 Claims**

1. A guiding instrument for drilling a bone cortical, and suitable for use as an auxiliary in positioning or orifices in an intra-marrow pin, comprising:

an elongated flat main body having a first free end provided thereat with a handle for grasping and manipulation thereof, and a second free end narrower than said flat body;

said second free end having a sharpened edge to facilitate and provide for the insertion of said second free end into soft tissue of a patient, and to separate the soft tissue from the bone cortical and free from enveloping the bone;

another flat body transversely oriented to said elongated flat

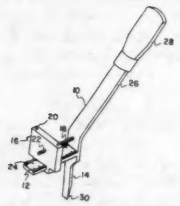
body, positioned between said free ends proximate to said second free end and being provided with a gauge in length units;

an alignment body slidably connected with said other flat body;

a screw connecting said alignment body to said elongated body for controlling and fastening of said alignment body to said elongated flat body;

said alignment body having two holes near narrower edges thereof and running parallel to the faces thereof; and

said second end of said elongated body and said other flat body being positioned 90° to each other to provide an effective support of said instrument on the bone cortical.



4,978,352

PROCESS FOR PRODUCING COLLAGEN-BASED CROSS-LINKED BIOPOLYMER, AN IMPLANT FROM SAID BIOPOLYMER, METHOD FOR PRODUCING SAID IMPLANT, AND METHOD FOR HERMETIZATION OF CORNEAL OR SCLERAL WOUNDS INVOLVED IN EYE INJURIES, USING SAID IMPLANT

Svyatoslav N. Fedorov, Ulitsa Dostoevskogo, 12, kv. 32; Sergei N. Bagrov, ulitsa Startovaya, 9, korpus 2, kv. 236; Vladislav T. Trofimov, ulitsa Zelenodolskava, 17, korpus 1, kv. 53; Tatyana S. Amstislavskaya, bulvar Yana Rainisa, 43, kv. 418, and Alexei V. Osipov, Leningradskoe shose, 50, kv. 233, all of Moscow, U.S.S.R.

Filed May 23, 1989, Ser. No. 356,263

Int. Cl.[5] B29D *11/00*; A61F *2/00*; A61K *37/12*

U.S. Cl. 606—166 **9 Claims**

1. A process for producing a collagen-based cross-linked biopolymer for ophthalmological uses, comprising:

alkali-salt treatment of animals' sclera;

homogenization of the thus-obtained tissue with an aqueous solution of an organic acid until a collagen solution is formed;

extraction of low molecular impurities from the collagen solution;

saturation of said solution with nitrous oxide;

brining the concentration of said collagen solution to 80 mass percent maximum;

exposure of said collagen solution to an ionizing radiation in a dose of 0.5 to 15 kGy until a cross-linked biopolymer is formed.

4,978,353

METHOD AND MEANS FOR PROTECTING CORNEAL ENDOTHELIUM AND IRIS DURING IOL IMPLANTATION

Michael L. Furillo, 29310 Whitingham Ct., Agoura Hills, Calif. 91301

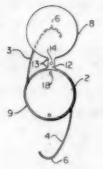
Filed Sep. 25, 1989, Ser. No. 411,719

Int. Cl.[5] A61F *2/16*

U.S. Cl. 623—6 **22 Claims**

9. A protective device for protecting the corneal endothelium and/or iris during implantation in the eye of an intraocular lens assembly including an intraocular lens portion having anterior and posterior surfaces defined by a peripheral edge, comprising:

(a) a unitary member having juxtaposed portions adapted to be releasably applied to the anterior and posterior surfaces of the intraocular lens; and



(b) means interconnecting said juxtaposed portions whereby said portions may selectively be disposed in a common plane or in parallel planes.

4,978,354

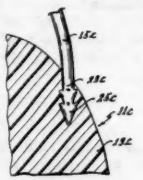
HAPTIC TO OPTIC ATTACHMENT FOR A SOFT IOL

Stanley L. Van Gent, Irvine, Calif., assignor to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 228,955, Aug. 4, 1988, Pat. No. 4,888,013, which is a division of Ser. No. 96,745, Sep. 15, 1987, Pat. No. 4,790,846, which is a continuation of Ser. No. 806,376, Dec. 9, 1985, abandoned. This application Nov. 2, 1989, Ser. No. 430,875

Int. Cl.[5] A61F *2/16*; B29D *11/00*

U.S. Cl. 623—6 **4 Claims**



1. An intraocular lens comprising:

at least one fixation member having a proximal end portion, said proximal end portion including a filament, a generally triangular barb and a trapezoidal barb coupling the triangular barb to a filament, said barbs being adapted to form a mechanical interlock;

an optic receiving said barbs and the proximal end portion to form a mechanical interlock between said barbs and the optic and to attach the fixation member to the optic;

said triangular barb being wider than the filament at one zone and having sides which tamper toward each other as the barb extends from said zone farther into the optic and

said trapezoidal barb being wider at one zone thereof and having sides which taper toward each other as the trapezoidal barb extends from such zone thereof farther into the optic.

4,978,355

PLASTIC BONE IMPLANT HAVING A REINFORCED CONTACT SURFACE

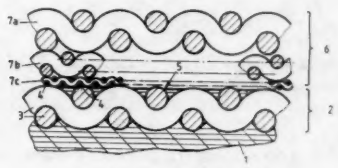
Otto Frey; Manfred Semlitsch, and Heinz Weber, all of Winterthur, Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 6, 1986, Ser. No. 816,340

Claims priority, application Switzerland, Jan. 25, 1985, 328/85

Int. Cl.[5] A61F 2/30

U.S. Cl. 623—16 5 Claims



1. A bone implant having a plastic body defining a contact surface for contacting a bone, a metal grid embedded in and exposed to said surface of said body to impart an increased wear resistance to said surface relative to a bone and a plurality of porous layers of metal wire secured to said metal grid and extending over said contact surface, said porous layers having pores of increasing size from layer-to-layer in a direction away from said contact surface.

4,978,356

BALL AND SOCKET BEARING FOR ARTIFICIAL JOINT

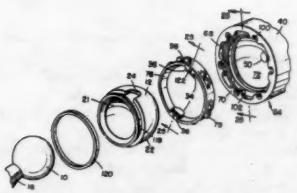
Douglas G. Noiles, New Canaan, Conn., assignor to Joint Medical Products Corporation, Stamford, Conn.

Continuation of Ser. No. 70,180, Jul. 6, 1987, abandoned, which is a division of Ser. No. 553,520, Nov. 21, 1983, Pat. No. 4,678,472, which is a continuation-in-part of Ser. No. 473,431, Mar. 8, 1983, Pat. No. 4,642,123. This application Feb. 1, 1989, Ser. No. 304,915

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.[5] A61F 2/30

U.S. Cl. 623—18 8 Claims



1. A system for use in forming an artificial ball and socket joint, said system comprising:

a ball portion including a ball and first fixation means adapted for attachment to a first bony structure, said fixation means being connected to said ball by a neck element; and

a socket portion including:

(a) second fixation means adapted for attachment to a second bony structure;

(b) at least a first bearing element having an inner bearing surface configured to receive and engage a portion of the ball wherein the ball in combination with the neck element are free to move within the bearing element in a plurality of directions, said engaged portion of the ball being more than a hemisphere so that the ball is physically constrained within the bearing element in the assembled joint;

(c) at least a second bearing element having an inner bearing surface configured to receive and engage a portion of the ball wherein the ball in combination with the neck element are free to move within the bearing element in a plurality of directions, said engaged portion of the ball being less than or equal to a hemisphere so that the ball is not physically constrained within the bearing element in the assembled joint; and

(d) securing means for interchangeably securing either the first bearing element or the second bearing element to the second fixation means.

4,978,357

ENDOPROSTHESIS

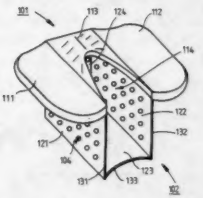
Volkmar Goymann, Essen; Emmanuel Anapliotis, and Curt Kranz, both of Berlin, all of Fed. Rep. of Germany, assignors to MECRON medizinische Produkte GmbH, Berlin, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 204,819

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1987, 8708501[U]; Jan. 22, 1988, 3802239

Int. Cl.[5] A61F 2/30

U.S. Cl. 623—18 7 Claims



1. A prosthesis for implanting into a prepared first bone, comprising:

a plateau having upper and lower surfaces, at least one bearing member configured to receive cooperating condyles of a second bone, said bearing member being disposed on said upper surface of the plateau;

a U-shaped anchoring element connected to said lower surface of the plateau, said U-shaped anchoring element including two elongated side plates extending outwardly and generally transversely to said lower surface wherein each of said side plates having bottom, front and rear edges; and

a connecting plate spaced a predetermined distance from said lower surface and extending between and connecting said side plates, said connecting plate and said side plates having means for cutting into the first bone upon insertion of the prosthesis therein.

4,978,358

ORTHOPAEDIC PROSTHETIC DEVICE POSSESSING IMPROVED COMPOSITE STEM DESIGN

John D. Bobyn, Annandale, Va., assignor to Zimmer Inc., Warsaw, Ind.

Continuation of Ser. No. 253,444, Oct. 6, 1988, abandoned, which is a continuation of Ser. No. 873,718, Jun. 12, 1986, abandoned. This application Jun. 21, 1989, Ser. No. 368,896

Int. Cl.[5] A61F 2/32

U.S. Cl. 623—23 2 Claims

1. An implantable composite prosthesis for replacement of a femoral hip joint comprising an elongated solid component defining a longitudinal axis and configured for insertion into a

prepared intramedullary canal, said component being metallic and including an enlarged proximal region having a neck element extending medially outwardly from the longitudinal axis, said solid component having a substantially cylindrical hollow bore spaced a predetermined distance laterally from the neck element and extending along the longitudinal axis

from the enlarged proximal region distally to a distal portion of the solid component; and

a separate nonmetallic inner component complimentarily shaped to the hollow bore and disposed therein whereby the flexural rigidity of the composite prosthesis can be customized to fit the individual needs of the patient.

4,978,359

PROSTHESIS SHAFT

Klaus Wilhelm; Johann Bauer, both of Munich; Werner Schmitt, Starnberg; Wolf-Dietrich Herold, Seefeld; Peter Koran, Weilheim; Erich Wanek, and Oswald Gasser, both of Seefeld, all of Fed. Rep. of Germany, assignors to Thera Patent GmbH & Co. KG Gesellschaft fur industrielle Schutzrechte, Seefeld, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 343,619

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1988, 8805583[U]

Int. Cl.[5] A61F *2/32*

U.S. Cl. 623—23 **6 Claims**

1. An implantable prosthesis comprising; an elongated shaft having a center line along its length, said shaft having opposite proximal and distal ends and configured for insertion into a cavity formed in a bone, the shaft having an outer surface formed by convex surfaces of a plurality of aligned spheres, said spheres having their centers disposed substantially along the center line of the shaft, the convex surfaces of adjacent spheres partially intersecting each other to form rounded concave transitional zones between the adjacent convex surfaces,

wherein the radii of the spheres decrease from the proximal end to the distal end of the shaft.

4,978,360

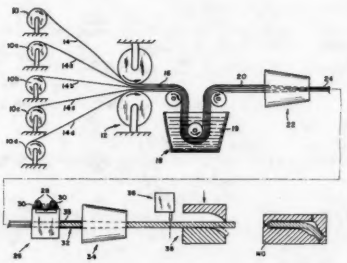
METHOD OF MANUFACTURING A COMPOSITE IMPLANT PROSTHESIS

Thirumalai N. C. Devanathan, Warsaw, Ind., assignor to Zimmer, Inc., Warsaw, Ind.

Division of Ser. No. 373,645, Jun. 21, 1989, Pat. No. 4,902,297, which is a continuation of Ser. No. 277,531, Nov. 28, 1988, abandoned, which is a continuation of Ser. No. 835,486, Mar. 3, 1986, abandoned. This application Oct. 26, 1989, Ser. No. 426,641

Int. Cl.[5] A61F *2/32*

U.S. Cl. 623—66 **4 Claims**



1. A method for constructing a composite implant prosthesis comprising the steps of:

(*a*) pulling a plurality of continuous strands of fiber through a series of work stations to form a core;

(*b*) impregnating the strands of fiber with a polymer material at a first station;

(*c*) braiding a first casing over all of the impregnated strands of fiber at a second station and partially embedding the braid into the impregnated strands of fiber;

(*d*) cutting the plurality of braided impregnated strands of fiber into discrete elements at a third station to separate the cut strands of fiber from the continuous strands at the first and second stations; and

(*e*) enclosing each discrete element within a second casing to define an outer contour for the composite implant prosthesis at a fourth station.

4,978,361

ECONOMY CHROME TANNING

Karlheinz Fuchs, Hünfelden, and Norbert Münch, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 25, 1989, Ser. No. 343,010
Claims priority, application Fed. Rep. of Germany, Apr. 27, 1988, 3814220
Int. Cl.[5] C14C *3/02, 3/04*
U.S. Cl. 8—94.27 5 Claims

1. A process for economy chrome tanning, which comprises:

pretreating a pelt prior to tanning with 0.5 to 2.0% by weight, of an aldehyde- or keto- carboxylic acid, together with pickling in a pickling bath, adding to the pickling bath 0.5 to 2.5% by weight, based on pelt weight of a mixture of chromium (III) salt, acid binding agents and aromatic di- or tricarboxylic acid,

tanning in a conventional manner; and

finish-tanning with 1.5 to 2% by weight, of the mixture of a chromium (III) salt, acid-binding agents, and aromatic di-tricarboxylic acid.

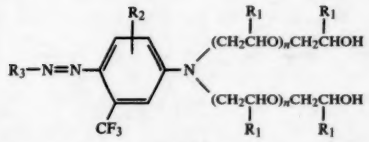
4,978,362

THERMOPLASTIC RESIN COMPOSITION CONTAINING POLYALKYLENEOXY-SUBSTITUTED AZO COLORING AGENTS HAVING TRIFLUOROMETHYL SUBSTITUENTS

Edward W. Kluger, Pauline, and John W. Rekers, Spartanburg, both of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 164,676, Mar. 7, 1988, abandoned, which is a continuation-in-part of Ser. No. 920,961, Oct. 20, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 256,270
Int. Cl.[5] D06P *3/00, 3/24, 3/79, 5/13*
U.S. Cl. 18—506 5 Claims

1. A colored thermoplastic resin composition which comprises a thermoplastic resin and a polyalkyleneoxytrifluoromethyl aniline colorant incorporated into said thermoplastic resin while said resin is in the plasticized or molten state in an amount sufficient to provide coloration to said thermoplastic resin, said colorant having the formula:



wherein R_1 is selected from H or CH_3; R_2 is H, CF_3, lower alkyl containing from 1 to 9 carbon atoms, Cl or Br; R_3 is aromatic or heteroaromatic, and n is an integer from 6 to about 75.

4,978,363

FIBER-TREATMENT ORGANO-FUNCTIONAL POLYSILOXANES AGENT COMPOSITION

Isao Ona; Masaru Ozaki, and Hidetoshi Kurusu, all of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,821
Claims priority, application Japan, May 30, 1988, 132155
Int. Cl.[5] C09B *67/00*
U.S. Cl. 8—581 8 Claims

1. A fiber-treatment agent composition consisting essentially of from about 1 to 100 percent by weight, based on the weight of the composition, of the reaction product of

(A) an organopolysiloxane represented by the formula

wherein R is a monovalent hydrocarbon group; A is and R group or a group with the formula $—R^2(NHCH_2CH_2)_aNH_2$: R^1 is a divalent hydrocarbon group; a=zero to 10; p and q are zero or more; with the proviso that p+q=10 to 2,000, and there is at least one $—R^1(NHCH_2CH_2)_2NH_2$ group in each molecule; and (B) 0.2 to 1.3 moles per 1 mole primary and secondary amino groups in component (A) of a higher fatty acid having 10 to 20 carbon atoms.

4,978,364

TRIIODIDE-PHOSPHORIC ACID STAIN AND METHOD FOR CELLULOSE FIBER EVALUATION

Hilary Walker, Marietta, and Edward P. Bullwinkel, Roswell, both of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 22, 1989, Ser. No. 455,464
Int. Cl.[5] C09B *67/00*
U.S. Cl. 8—645 19 Claims

1. A stain solution to evaluate cellulose fibers, comprising:

an aqueous triiodide solution of iodide and iodine, wherein the molar ratio of iodide to iodine is 1 or greater; and

an acid solution from about 72 percent to about 82 percent by weight of phosphoric acid, wherein the triiodide solution and the acid solution are mixed together just prior to use to provide a triiodide stain with a molar content in the range of about 0.0006 to about 0.0017 molar triiodide.

4,978,365

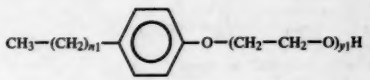
PREPARATION OF IMPROVED STABLE CRUDE OIL TRANSPORT EMULSIONS

Armand A. Gregoli, Tulsa; John A. Hamshar, Owasso; Andrew M. Olah, Broken Arrow; Christopher J. Riley, Tulsa, and Daniel P. Rimmer, Broken Arrow, all of Okla., assignors to Canadian Occidental Petroleum Ltd., Calgary, Canada

Continuation-in-part of Ser. No. 934,683, Nov. 24, 1986, Pat. No. 4,725,287. This application Oct. 27, 1987, Ser. No. 114,204
The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.
Int. Cl.[5] C10L *1/32;* B01F *17/42;* B01J *13/00*
U.S. Cl. 44—301 35 Claims

1. A process for preparing an oil-in-aqueous phase emulsion comprising:

agitating a hydrocarbon with an emulsifying composition comprising an aqueous phase and a minor amount of an emulsifying agent at a temperature of from about 100° F. to about 200° F. to form n oil-in-aqueous phase emulsion, wherein the amount of aqueous phase in said oil-in-aqueous phase emulsion is from about 15% to about 60% by weight, wherein the emulsifying agent is used in an amount sufficient to assist in the formation of said oil-in-aqueous phase emulsion, and wherein said emulsifying agent comprises at least one ethoxylated alkylphenol compound having the general formula;



wherein n_1 is an integer having a value of from about 7 to about 20, and y_1 is an integer having a value of from about 4 to about 1000; and said at least one ethoxylated alkylphenol compound has a molecular weight distribution with a dispersity of from about 1.0 to about 5.0 and with a weight average molecular

weight of from about 1966 to about 9188; and wherein at least about 50% by weight of the emulsifying agent comprises said at least one ethoxylated alkylphenol compound having a molecular weight of from about 1966 to about 1988; and from 1% by weight to 90% by weight of the emulsifying agent comprises said at least ethoxylated alkylphenol compound wherein v_1 has a value greater than 100.

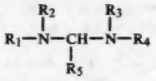
4,978,366

DISTILLATE FUELS STABILIZED WITH DIAMINOMETHANE AND METHOD THEREOF

Jerry J. Weers, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

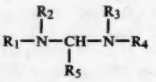
Filed Jan. 14, 1988, Ser. No. 143,782
Int. Cl.[5] C10L *1/22*
U.S. Cl. 44—334 **22 Claims**

1. A fuel oil comprising a distillate fuel oil having incorporated therein a diaminomethane of the formula



wherein R_1, R_2, R_3 and R_4 are independently selected from the group consisting of alkyl, cycloalkyl, alkenyl, cycloalkenyl and five or six member heterocyclic groups wherein R_1 with R_2 or both R_1 and R_2 and R_3 with R_4 are alkylene groups joined together with their adjacent N to form a heterocyclic ring and wherein R_5 is a member selected from the group consisting of hydrogen and lower alkyl in an mount effective to increase color stability or resistance to sedimentation of said fuel oil.

12. A method of treating a distillate fuel oil which comprises incorporating therein a diaminomethane of the formula



wherein R_1, R_2, R_3 and R_4 are independently selected from the group consisting of alkyl, cycloalkyl, alkenyl, cycloalkenyl and five or six member heterocyclic groups wherein R_1 with R_2 or both R_1 with R_2 and R_3 with R_4 are alkylene groups joined together with their adjacent N to form a heterocyclic ring and wherein R_5 is a member selected from the group consisting of hydrogen and lower alkyl in an amount effective to increase color stability or resistance to sedimentation of said fuel.

4,978,367

RADIATION ENHANCEMENT IN OIL/COAL BOILERS CONVERTED TO NATURAL GAS

Alex E. S. Green, Gainesville; Bruce A. S. Green, Micanopy, and John C. Wagner, Gainesville, all of Fla., assignors to University of Florida, Gainsville, Fla.

Continuation-in-part of Ser. No. 176,157, Mar. 31, 1988, abandoned. This application Dec. 16, 1988, Ser. No. 285,818
Int. Cl.[5] C10L *1/32*
U.S. Cl. 44—281 **8 Claims**

5. A fuel composition for use in combustion in a furnace having a radiant energy portion and a convective energy portion consisting essentially of:

(a) a slurry consisting essentially of micronized coal having a particle size in the range of from about 1 to about 50 microns in No. 2 fuel oil;

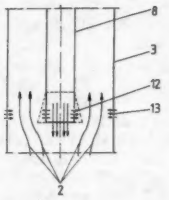
(b) natural gas; whereby combustion of said micronized coal/oil slurry enhances the flame radiance of the natural gas flame in the infrared range between about 1 micron and 10 microns, such that more energy is provided to the radiant energy section of the furnace reducing the energy to the convective sections of the furnace, thus increasing fuel consumption efficiency and avoiding convective sections overheating.

4,978,368

DEVICE FOR COOLING HOT PRODUCT GAS EXITING FROM A GASIFICATION REACTOR

Hans-Günter Richard, Essen, Fed. Rep. of Germany, assignor to Krupp koppers GmbH, Essen, Fed. Rep. of Germany

Division of Ser. No. 322,077, Mar. 10, 1989, Pat. No. 4,936,873. This application Aug. 10, 1989, Ser. No. 392,133
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808729
Int. Cl.[5] C10J *3/89*
U.S. Cl. 48—87 **1 Claim**



1. A system comprising a gasification reactor having an outlet opening; a duct extending from said outlet opening for conducting a stream of a hot product gas exiting from the gasification reactor to outside; and means for cooling the stream of a hot gas product in said duct, said cooling means comprising first radial opening formed in said duct adjacent to said outlet opening and defining inlet means for feeding a first partial stream of cooling fluid into an outer portion of said product gas stream; a quenching pipe coaxially arranged within said duct and having a mouth opening in a vicinity of a level of said radial openings to feed axially a second partial stream of cooling fluid against a central portion of said product gas stream, a mouth region of said quenching pipe having lateral discharge openings for radially discharging a part of said second partial stream of cooling fluid, said duct further including second radial opening arranged at a level of said lateral discharge openings of said quenching pipe to feed a portion of said first partial stream of cooling fluid into said duct.

4,978,369

PROCESS FOR FEEDING CARBONACEOUS MATERIAL INTO REACTION SPACES

Bernd Pontow, Dorsten; Hans-Peter Wenning, Raesfeld; Albert Grimminger, Warmbronn, and Jurgen Strecker, Stuttgart, all of Fed. Rep. of Germany, assignors to Veba OEL Entwicklungs-Gesellschaft mbH, Gelsenkirchen and Pfleiderer GmbH, Stuttgard, both of, Fed. Rep. of Germany

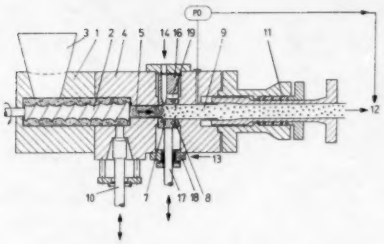
Filed Jun. 13, 1988, Ser. No. 206,131
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719408
Int. Cl.[5] C10J *3/46, 3/50;* C10B *13/00*
U.S. Cl. 48—197 R **12 Claims**

1. A process for feeding of solid particulate or fluid carbonaceous materials or mixtures of such materials into reactor spaces operating under pressure, comprising the steps of:

using at least one screw conveyor rotatable in a closely fitting housing for conveying and compressing the feed material into a plug of compressed feed material which is impervious at the pressure predominating in the reactor and is continuously renewed as it enters the latter as a strand of feed material;

conveying the strand via a delivery head having a nozzle into the reactor; and

using a closure member provided with a passage opening through which passes said strand in said delivery head for shutting off the flow of feed material to the reactor pressure space as well as any appreciable backflow of process gases from the reactor into the screw conveyor area, wherein said process includes the step of disintegrating the strand of feed material at a position of the flow thereof



between said delivery head and said pressure space, said disintegrating step comprising directing high pressure fluid media at normal or elevated temperature through nozzles and onto said strand of feed material, wherein said high pressure fluid media are fed at high pressure via bores leading through said closure member and nozzles which are in connection with said bores into said passage opening of the closure member through which said strand passes.

4,978,370

METHOD AND APPARATUS FOR REDUCTION OF THE PRESSURE IN A LIQUID MIXTURE

Kjell Klintenstedt, Saltsjö-Boo, Sweden, assignor to Alfa-Laval Separation AB, Tumba, Sweden

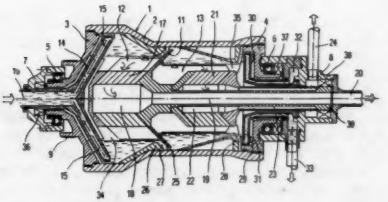
PCT No. PCT/SE87/00535, § 371 Date Mar. 15, 1989, § 102(e) Date Mar. 15, 1989, PCT Pub. No. WO88/03984, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 16, 1987, Ser. No. 339,612

Claims priority, application Sweden, Nov. 28, 1986, 8605117

Int. Cl.[5] B01D *19/00*

U.S. Cl. 55—36 **9 Claims**



1. A method for reducing pressure in a liquid mixture of hydrocarbons which comprises supplying the liquid mixture at a predetermined pressure to a rotating vessel at a point near its rotational axis, conducting the mixture radially outwardly through a channel to an inlet of a chamber formed in the vessel, said inlet being situated at a first radial level, the mixture being conducted through said channel in a manner to maintain the mixture at a pressure not substantially lower than said predetermined pressure but substantially lower than it would have been at said first radial level if the mixture had been allowed to flow freely in the channel and been simultaneously entrained in the rotation of the vessel, bringing the liquid mixture in the chamber into rotation with the vessel by means of entrainment members connected with the vessel, maintaining a free liquid surface in said chamber, at a second radial level inwardly of said first level, maintaining a part of said chamber liquid-free radially inwardly of said free liquid surface to receive gas evaporated from said mixture, maintaining a gas pressure lower than said predetermined pressure in the liquid-free part of said chamber, removing liquid from the chamber at a radial level inwardly of said first level, and removing liquid and gas from the vessel, gas being removed from the liquid-free part of the chamber.

4,978,371

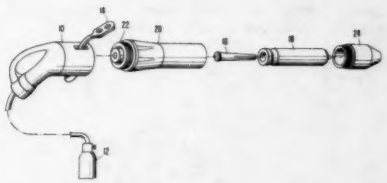
FILTERED STATIC ELIMINATING BLOW-OFF GUN

Eli Smyrloglou, 4 Kidder Rd., Chelmsford, Mass. 01824

Filed Sep. 26, 1989, Ser. No. 412,472

Int. Cl.[5] B03C *3/38*

U.S. Cl. 55—102 **10 Claims**



1. A device for clean room application comprising:

a static elimination means having a housing with a gas inlet end and a gas outlet end;

a removable compact hollow fiber filter retained in the gas inlet end of said housing; and

gas supplying means in communication with the gas inlet end, so that gas passes from said gas supplying means and through said hollow fiber filter and into said static elimination means.

4,978,372

PLEATED CHARGED MEDIA AIR FILTER

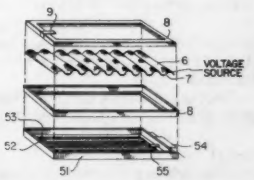
William Pick, R.R. #1, Carleton Place, Ontario, Canada K7C 3P1

Filed Mar. 10, 1989, Ser. No. 321,397

Claims priority, application Canada, Mar. 11, 1988, 561231

Int. Cl.[5] B03C *3/00*

U.S. Cl. 55—132 **10 Claims**



1. In an air filtration system of the charged media type, the combination of:

electrically conductive charging media having passageways therethrough to allow for the substantially free passage of air, said charging media being in one or more pairs with the media of each pair complementarily corrugated and located in opposed spaced-apart relationship;

a filter medium comprising a fibrous filter pad complementa-

rily corrugated with said charging media and disposed between the media of each said pair of charging media;

electrically insulating spacers separating said filter pad from at least one of said charging media adjacent said filter pad;

means for connecting the charging media of each said pair to respective poles of a high voltage power supply; and

frame means for supporting said charging media, said filter media and said insulating spacers in their aforesaid relationship with one another within said air filtration system.

4,978,373

FLUID SEPARATION APPARATUS

John A. Endacott, 84 Hersham Road, Walton-on-Thames, Surrey, KT12 5NU, England

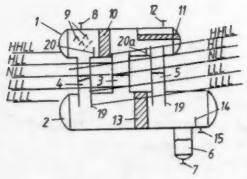
PCT No. PCT/GB89/00241, § 371 Date Dec. 20, 1989, § 102(e) Date Dec. 20, 1989, PCT Pub. No. WO89/10780, PCT Pub. Date Nov. 16, 1989

PCT Filed Mar. 7, 1989, Ser. No. 438,402

Claims priority, application United Kingdom, May 6, 1988, 8810817; Canada, Apr. 3, 1989, 595519

Int. Cl.[5] B01D *19/00*

U.S. Cl. 55—165.000 **12 Claims**



1. Apparatus for a moving vessel or vehicle for separating gases and liquids, said apparatus comprising a container adapted to receive a mixture of gas and liquid and including at least two tanks which are connected by a plurality of tubes, each tube being located in the upper wall of a first tank which is located at a lower level than a second tank and said tubes being spaced apart, and means to maintain the liquid/gas interface at a substantially constant level within each tube so as to reduce agitation of the liquid/gas interface during movement of the vessel or vehicle.

4,978,374

LIQUID HYDROCARBON DELIVERY MEANS INCLUDING MEANS FOR MONITORING GAS CONTENT

Sylvain Janssen, Neuilly, and Jacques Fournier, Bretigny S/Orge, both of France, assignors to Schlumberger Industries, Montrouge, France

Filed Aug. 22, 1989, Ser. No. 396,719

Claims priority, application France, Sep. 2, 1988, 88 11529

Int. Cl.[5] B01D *19/00*

U.S. Cl. 55—165 **4 Claims**

1. Hydrocarbon delivery means comprising:

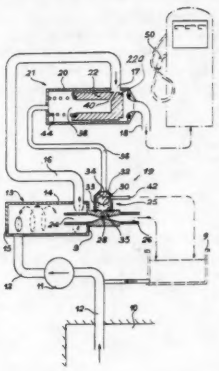
a pump for extracting hydrocarbon from a storage tank;

a vortex type degassing device comprising an inlet duct connected to said pump, an outlet duct, and an axial auxiliary outlet for taking off a fraction of the hydrocarbon which is enriched in gas;

a hydrocarbon delivery tube;

a control valve mounted between said delivery tube and the outlet from said degassing device; and

a servo-control device for servo-controlling said control valve as a function of the gas content in the hydrocarbon, said servo-control device comprising a venturi system mounted on said auxiliary outlet and means for causing



said control valve to close as a function of the pressure in said venturi system.

4,978,375

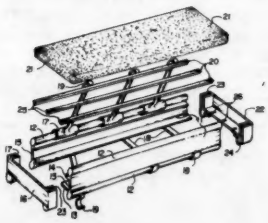
PLASTIC AIR FILTER HOUSING ASSEMBLY FOR USE IN AIR CONDITIONERS AND HEATING SYSTEMS

Kim Il Yoo, Alexandria, Va., assignor to Permanent Solution Industries, Inc., Falls Church, Va.

Filed Dec. 29, 1989, Ser. No. 459,241

Int. Cl.[5] B01D *46/00*

U.S. Cl. 55—493 **4 Claims**



1. An air filter housing assembly containing an air filter for use in conjunction with air conditioning and heating system which comprises:

first and second plastic longitudinal base members including a pair of longitudinal upper and lower edges, a back, and a pair of shelves extended from said back, respectively,

a pair of plastic transverse base members including a pair of vertical slots and round shape slots extended from said vertical slots for tightly receiving both ends of the longitudinal base members, said pair of plastic transverse base members further including a plurality of grooves, respectively,

a plurality of plastic transverse frames including a pivotal round shape connecting member disposed at one end thereof for slidably engaging with said first longitudinal upper end lower edges, a hook type locking member disposed at the other end thereof for slidably engaging with and separating from said second longitudinal upper and lower edges, and a downward pushing rod portion for pushing the air filter so as to retain the air filter in the air filter assembly, and

a plurality of longitudinal frames to be cross located to said transverse frames pivotably attached to said upper edge, said plurality of longitudinal frames including an engaging

portion disposed at the lower portion thereof for tightly engaging in said grooves of the transverse base member, respectively, whereby the air filter housing assembly can be easily assembled and disassembled and the air filter can be easily inserted into and removed from the air filter housing assembly.

4,978,376

CRYSTALLINE OPTICAL FIBER AND ITS METHOD OF MANUFACTURE

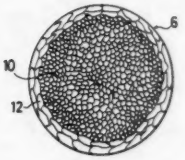
Kenichi Takahashi, and Noriyuki Yoshida, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 118,061, Nov. 5, 1987, abandoned, which is a division of Ser. No. 26,323, Mar. 16, 1987, Pat. No. 4,865,418. This application Apr. 10, 1989, Ser. No. 336,626

Claims priority, application Japan, Mar. 15, 1986, 61-57477; Mar. 18, 1986, 61-61545

Int. Cl.[5] C03B *37/027, 37/02*

U.S. Cl. 65—3.11 **1 Claim**



1. A method of manufacturing a crystalline optical fiber, comprising the steps of:

forming a halide glass preform consisting essentially of a silver halide crystal containing a mixture of AgBr and AgCl, the main constituent of said mixture is a compound selected from the group consisting of AgBr and AgCl and is mixed with 0.1 to 10% by weight of the remaining one of said AgBr and AgCl;

heating said preform by placing said preform in a pair of dies heated to a predetermined temperature in the range of 80 to 200° C. so as to preheat said preform to said predetermined temperature; and

extruding said preform in said pair of dies through an extrusion die nozzle at said predetermined temperature at a speed of 5 to 30 mm/min. while said preform is retained at said predetermined temperature, to thereby form an elongate crystalline optical fiber including a core having small crystal grains and a cladding having large crystal grains as compared with the core crystal grains, said cladding surrounding and covering said core so as to define a boundary layer therebetween.

4,978,377

METHOD OF ASSEMBLING A FIBER OPTIC PREFORM FROM DISCRETE PREFORMED ELEMENTS

Claude Brehm, Montrouge; Josiane Ramos, Bondoufle, and Philippe Dupont, Melun, all of France, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Dec. 7, 1989, Ser. No. 447,554

Claims priority, application France, Dec. 9, 1988, 88 16224

Int. Cl.[5] C03C *25/02*

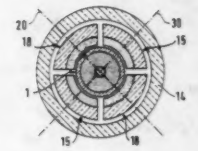
U.S. Cl. 65—3.11 **10 Claims**

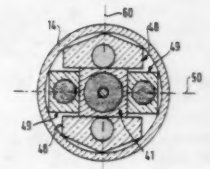
1. A method of assembling a preform for a polarization-maintaining optical fiber, comprising the steps of

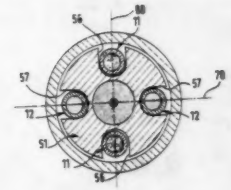
providing a basic monomode preform comprising a solid elongated silica core of circular cross section surrounded by a solid silica cladding, said basic preform having a longitudinal axis intersected by two orthogonal planes of symmetry,

attaching on the outside face of said basic preform a first pair of discrete preformed elongated stress elements each consisting essentially of silica doped with boron oxide, said first pair of elongated stress elements being disposed symmetrically about one of said planes and parallel to said axis,

attaching on the outside face of said basic preform a second pair of discrete preformed elongated stress elements each consisting essentially of silica doped with titanium oxide said second pair of elongated stress elements being disposed symmetrically about the other of said planes and parallel to said axis, wherein said basic preform, said first pair of elongated stress elements, and said second pair of elongated stress elements complement one another in cross section so as to form a substantially solid cylinder of circular cross section, consisting of the basic preform and two pairs of elongated stress elements, when the two pairs of elongated stress elements are attached to the basic preform.







4,978,378

METHOD FOR PRODUCING GLASS PREFORM FOR OPTICAL FIBER

Masumi Ito; Hiroshi Yokota; Toshio Danzuka, and Masahiro Takagi, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 28, 1989, Ser. No. 372,084

Claims priority, application Japan, Jun. 28, 1988, 63-159058

Int. Cl.[5] C03B *37/012*

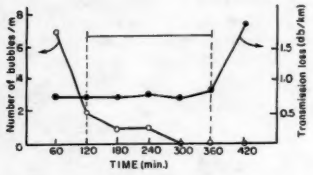
U.S. Cl. 65—3.12 **4 Claims**

1. A method for producing a glass preform for use in the fabrication of an optical fiber, which method comprises steps of:

depositing glass soot on a periphery of a starting glass rod to form a porous glass preform;

heating and sintering the porous glass preform in a helium atmosphere to consolidate the porous glass preform; and

heating the sintered glass preform in an atmosphere containing an inert gas except helium having partial pressure of



the inert gas of not lower than 0.8 atm under a total pressure of one atm said sintered glass preform heating taking place at a temperature of 800° to 1000° C. for 120 to 360 minutes to obtain a transparent glass preform.

4,978,379

METHOD OF JOINING SEMICONDUCTOR SUBSTRATES

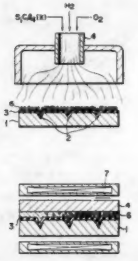
Renshi Sawada, Tokorozawa, and Junji Watanabe, Tokyo, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Continuation of Ser. No. 851,773, Apr. 14, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 266,304

Claims priority, application Japan, Apr. 19, 1985, 60-82609

Int. Cl.[5] C03B *19/06*; C03C *27/00*

U.S. Cl. 65—18.2 **17 Claims**



1. A method of manufacturing a semiconductor substrate, comprising the steps of:

flame hydrolyzing with an oxyhydrogen flame, at least one of SiH_4 gas and a silicon halogenide compound and further at least one dopant of boron trichloride and phosphorous trichloride, to form glass particles containing silicon dioxide, spray-depositing said glass particles onto a surface of an oxide insulating film carried on a semiconductor substrate;

placing a second substrate, serving as a support, on said glass particles deposited on said insulating film of said semiconductor substrate to thereby form a layered structure; and

heat-treating said layered structure by heating to a temperature of 800° C. to 1,300° C. and which is a sintering temperature of the glass particles, in an atmosphere of helium and oxygen gases to thereby sinter said glass particles to join said semiconductor substrate with said second substrate.

4,978,380

MOULD MECHANISMS

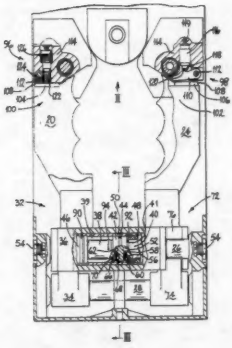
Hermann H. Nebelung, Winsen/Luhe, Fed. Rep. of Germany, and Johann Zeifkovits, Forch, Switzerland, assignors to Emhart Industries, Inc., Towson, Md.

Filed Nov. 27, 1989, Ser. No. 441,686

Claims priority, application United Kingdom, Dec. 15, 1988, 8829252

Int. Cl.[5] C03B *9/44*

U.S. Cl. 65—260 **4 Claims**



1. A mold mechanism for a glassware forming mounting comprising

a first mold support including an integral mounting assembly having

first cylindrical sleeve means adapted to be displaced relative to a stationary piston, and

second cylindrical sleeve means parallel to said first cylindrical sleeve means,

a second mold support including an integral mounting assembly having

third cylindrical sleeve means adapted to be displaced relative to a stationary piston and

fourth cylindrical sleeve means parallel to said third cylindrical sleeve means,

a first shaft for supporting said first sleeve means,

second shaft means for supporting said second and fourth sleeve means and

a third shaft for supporting said third sleeve means, and

stationary piston means for displacing said first and third sleeve means between mold open and mold closed positions.

4,978,381

METHOD FOR TREATING CEREAL CROP SEED WITH CHITOSAN TO ENHANCE YIELD, ROOT GROWTH, AND STEM STRENGTH

Lee A. Hadwiger, Pullman, Wash., assignor to Washington State University Research Foundation, Pullman, Wash.

Continuation-in-part of Ser. No. 795,702, Nov. 5, 1985, abandoned, which is a continuation of Ser. No. 658,084, Oct. 5, 1984, abandoned. This application Apr. 4, 1989, Ser. No. 344,287

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.[5] A01N *43/16*

U.S. Cl. 71—77 **12 Claims**

1. A method of enhancing cereal crop yield, straw strength, stem diameter, and root development comprising:

applying chitosan in solution in an effective amount to cereal crop seed.

4,978,382
PESTICIDES BASED ON 2-HALOGENOALKYLTHIO-SUBSTITUTED PYRIMIDINE DERIVATIVES

Udo Kraatz, Leverkusen; Ernst Kysela, Bergisch Gladbach; Jürgen Hartwig, Leverkusen, and Benedikt Becker, Mettmann, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

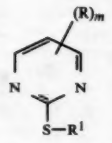
Filed Sep. 18, 1989, Ser. No. 408,850

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832530; Apr. 13, 1989, 3912155

Int. Cl.[5] C07D *239/38;* A01N *43/54*

U.S. Cl. 71—92 15 Claims

1. A method of combating pests which comprises applying to such pests or to a pest habitat a pesticidally effective amount of a 2-halogenoalkylthio-substituted pyrimidine of the formula



(I)

in which

R^1 represents halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms,

R represents hydrogen, in each case straight-chain or branched alkyl, alkylthro, alkoxy, halogenoalkyl, halogenoalkylthio or halogenoalkoxy, in each case having 1 to 4 carbon atoms and, in the case of halogenoalkyl, halogenoalkylthio and halogenoalkoxy, having 1 to 9 identical or different halogen atoms, or represents phenyl which is optionally substituted by identical or different substituents selected from the group consisting of halogen, nitro, alkyl and alkoxy in each case having 1 to 4 carbon atoms, or halogenoalkyl having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, or halogen and

m represents a number 0, 1, 2 or 3.

4,978,383
N-PHENYLSULFONYL-N'-TRIAZINYLUREAS

Erfinders K. Gass, Magden; Werner Föry, Basel; Willy Meyer, Riehen, and Werner Töpfl, Dornach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

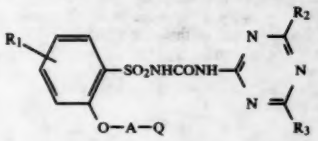
Continuation-in-part of Ser. No. 458,799, Jan. 18, 1983, Pat. No. 4,618,363. This application Sep. 19, 1985, Ser. No. 777,502

Claims priority, application Switzerland, Jan. 25, 1982, 437/82

Int. Cl.[5] C07D *251/46, 251/52;* A01N *43/68, 43/66*

U.S. Cl. 71—93 21 Claims

1. A compound selected from the group consisting of a sulfonylurea of the formula:



wherein

R_1 is hydrogen, halo, or alkyl of 1 to 4 carbon atoms;

R_2 is alkyl or alkoxy, each of 1 to 3 carbon atoms, unsubstituted or substituted with 1 to 3 halogen atoms;

R_3 is halo, hydrogen, unsubstituted alkyl of 1 to 3 carbon atoms, alkyl of 1 to 3 carbon atoms substituted with alkoxy of 1 to 4 carbon atoms or with 1 to 3 halogen atoms, unsubstituted alkoxy of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms substituted with methoxy, ethoxy, or 1 to 3 halogen atoms, or $—NR_4R_5$ in which R_4 is hydrogen or methyl and R_5 is hydrogen, methyl, ethyl, or methoxy; and

Q is cyano or —COB in which B is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms; phenyl; phenyl substituted with cyano, nitro, halo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkythio of 1 to 4 carbon atoms, or haloalkyl of 1 to 3 carbon atoms; amino; alkylamino of 1 to 4 carbon atoms; or dialkylamino of 1 to 4 carbon atoms in each alkyl group; and

A is alkylene of 1 to 4 carbon atoms or alkenylene of 2 to 4 carbon atoms; and

the alkali metal, alkaline earth metal, and organic amine salts thereof.

19. A method of suppressing plant growth, which method comprises applying thereto or to the locus thereof an effective amount of a compound according to claim 1.

4,978,384
SUBSTITUTED 2, 6-SUBSTITUTED PYRIDINE COMPOUNDS

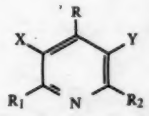
Len F. Lee, St. Charles, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 62,012, Jun. 15, 1987, Pat. No. 4,826,530, which is a division of Ser. No. 602,021, Apr. 24, 1984, Pat. No. 4,692,184. This application May 1, 1989, Ser. No. 345,812

Int. Cl.[5] A01N *43/40;* C07D *213/30*

U.S. Cl. 71—94 5 Claims

1. A compound represented by the structural formula



wherein:

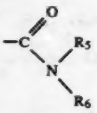
R is selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl, lower alkenylalkyl, haloalkyl, haloalkenyl, C_{3-7} cycloalkyl, C_{3-6} cycloalkanylalkyl, phenyl, phenylmethyl, alkoxy-alkyl, benzyloxymethyl, alkylthioalkyl, dialkoxy-alkyl, (1-alkoxy-1-alkylthio)alkyl, aminoalkyl, alkylaminoalkyl, dialkylaminoalkyl, alkylsulfonylalkyl, alkylsulfinylalkyl, alkyl substituted with a dialkylsulfonium salt, cyanoalkyl, carbalkoxyalkyl, carbalkoxyalkenyl, alkenyl, dialkylaminoalkenyl, saturated and unsaturated heterocyclic radicals selected from the group consisting of furyl, pyridyl, thienyl, thiiranyl, oxiranyl, and aziridinyl wherein the radical is joined to the pyridine ring by a C—C bond, and lower alkyl substituted with a saturated or unsaturated heterocyclic radical selected from the group consisting of furyl, pyridyl, thienyl, thiranyl, oxiranyl, and azirdinyl;

R_1 and R_2 are independently selected from alkyl, fluorinated methyl, and chlorofluorinated methyl radicals, provided that one of R_1 and R_2 must be a fluorinated methyl or chlorofluorinated methyl radical; and

X and Y are independently selected from the group consisting of

where Z_1 is NR_7 where R_7 is selected from hydrogen and lower alkyl and wherein Z_2 is selected from O and S, and wherein R_3 is each occurrence is independently selected from hydrogen, alkyl C_{1-46}, alkenylalkyl C_{3-4}, haloalkyl C_{1-4}, cyanoalkyl, cycloalkanylalkyl, alkynylalkyl C_{3-4}, provided that when Z_2 is S is both occurrences, R_3 must be lower alkyl C_{1-2};

wherein R_4 is selected from hydrogen and halogen;



wherein R_5 and R_6 are independently selected from hydrogen, lower alkyl, and phenyl;

$-CH_2OH$ and

$-C\equiv N$.

4,978,385

4-HALOPYRIDINE-3-CARBOXAMIDE COMPOUNDS AND HERBICIDAL COMPOSITIONS THEREOF

Hiroshi Yagihara; Yukihisa Goto, both of Himeji; Kazuhisa Masamoto, Arai; Yasuo Morishima, Kobe, and Hirokazu Osabe, Himeji, all of Japan, assignors to Daicel Chemical Industries Ltd., Japan

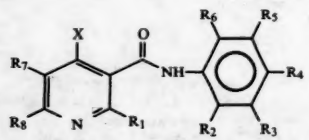
Filed May 26, 1988, Ser. No. 199,187

Claims priority, application Japan, May 29, 1987, 62-131696; Oct. 16, 1987, 62-262333

Int. Cl.[5] A01N *43/40, 43/42;* **C07D** *221/02, 215/38*

U.S. Cl. 71—94 **30 Claims**

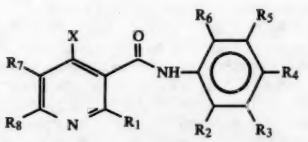
1. A compound of the formula 1:



(I)

or 1-oxide or salt thereof, wherein R_1 is a C_{1-11} alkyl group, a lower alkenyl group, a lower alkynyl group, a cycloalkyl group, a lower alkoxy-alkyl group, a lower alkylthioalkyl group, a phenyl group which can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, an aralkyl group whose nucleus can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, and a haloalkyl group; R_2, R_3, R_4, R_5 and R_6 are the same or different and are selected from the group consisting of a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amine group, a lower alkyl group, a lower haloalkyl group, a hydroxy group, a lower alkoxy group, an aryloxy group, a carboxy group or a lower alkoxycarbonyl group; R_7 is a hydrogen atom, a halogen atom, a lower alkyl group, a phenyl group which can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, an aralkyl group whose nucleus can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, a lower alkenyl group, a lower alkynyl group, a lower alkoxy group or a haloalkyl group; R_8 is a C_{1-11} alkyl group, a lower alkenyl group, a lower alkynyl group, a cycloalkyl group, a lower alkoxyalkyl group, a lower alkylthioalkyl group, a phenyl group which can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, an aralkyl group whose nucleus can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, a haloalkyl group; or R_7 and R_8 may be combined to form a group of $-(CH_2)_m-$ (wherein m is 3 or 4); and X is a halogen atom.

11. A herbicidal composition comprising a compound of the formula 1:



(I)

or 1-oxide or salt thereof, wherein R_1 is a C_{1-11} alkyl group, a lower alkenyl group, a lower alkynyl group, a cycloalkyl group, a lower alkoxy-alkyl group, a lower alkylthioalkyl group, a phenyl group which can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, an aralkyl group whose nucleus can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, a haloalkyl group; R_2, R_3, R_4, R_5 and R_6 are the same or different and are selected from the group consisting of a hydrogen atom, a halogen atom, a cyano group, a nitro group, an amino group, a lower alkyl group, a lower haloalkyl group, a hydroxy group, a lower alkoxy group, an aryloxy group, a carboxy group or a lower alkoxycarbonyl group; R_7 is a hydrogen atom, a halogen atom, a lower alkyl group, a phenyl group which by unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, aralkyl group whose nucleus can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, a lower alkenyl group, a lower alkynyl group, a lower alkoxy group or a haloalkyl group; R_8 is a C_{1-11} alkyl group, a lower alkenyl group, a lower alkynyl group, a cycloalkyl group, a lower alkoxyalkyl group, a lower alkylthioalkyl group, a phenyl group which can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, an aralkyl group whose nucleus can be unsubstituted or substituted by one or two groups selected from the group consisting of a halogen atom, a lower alkyl group and a lower alkoxy group, a haloalkyl group or R_7 and R_8 may be combined to form a group of $-(CH_2)_m-$ (wherein m is 3 or 4); and X is a halogen atom and a carrier therefor.

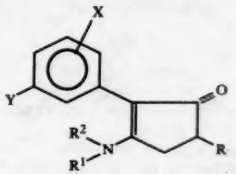
4,978,386

HERBICIDAL 2-(SUBSTITUTED-PHENYL)-3-AMINO-2-CYCLOPENTENONE DERIVATIVES

Carl E. Ward, San Jose, Calif., assignor to Chevron Research Company, San Francisco, Calif.

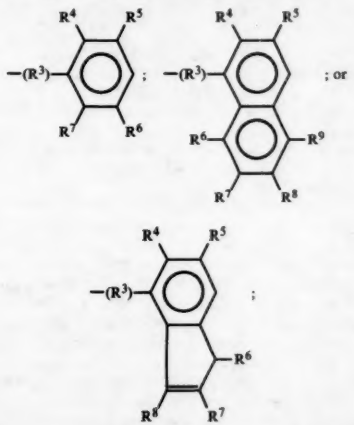
Continuation-in-part of Ser. No. 743,466, Jun. 11, 1985, abandoned. This application Oct. 31, 1985. Ser. No. 794,345
Int. Cl.[5] A01N *33/02, 43/00, 43/02, 43/40;* C07D *333/22;* C07C *211/00*
U.S. Cl. 71—121 52 Claims

1. A compound having the formula:



(I)

wherein R is lower alkyl, cycloalkyl having 3 through 7 carbon atoms; lower alkenyl; fluoroalkyl having 1 through 4 carbon atoms and 1 through 3 fluorine atoms; haloalkenyl having 2 through 4 carbon atoms and 1 through 3 halo atoms independently selected from the group of fluoro, chloro, bromo, or iodo; lower alkoxyalkyl wherein the alkyl and alkoxy moieties independently have 1 through 3 carbon atoms; alkylthioalkyl wherein the alkyl moieties independently have 1 through 3 carbon atoms; phenyl, naphthyl, inden-1-yl; 4-fluorophenyl; 4-chlorophenyl; thienyl; furyl; arylalkylene having 1 through 3 carbon atoms in the alkylene moiety and wherein the aryl moiety is phenyl, nephth-1-yl or inden-1-yl; or R is a substituted aryl or substituted arylalkylene selected from the group having the formulas:



wherein one, two or three of R^4, R^5, R^6, R^7, R^8, and R^9 are independently selected from the group of lower alkyl, lower alkoxy, halo, nitro, or haloalkyl having 1 through 3 carbon atoms and 1 through 3 of the same or different halo atoms, and the remainder are hydrogen; and R^3 is a single bond or alkylene having 1 through 3 carbon atoms;

R^1 is hydrogen or alkyl having 1 through 4 carbon atoms;

R^2 is hydrogen, alkyl having 1 through 4 carbon atoms, alkenyl having 3 or 4 carbon atoms, lower alkoxycarbonylalkyl, lower alkoxyalkyl or lower alklylthioalkyl; or

R^1 and R^2 together with the nitrogen atom to which they are joined form a saturated or unsaturated nitrogen heterocycle having 5 or 6 ring atoms one of which is nitrogen and the remainder are carbon atoms;

X is hydrogen, lower alkyl, lower alkoxy, halo, or trifluoromethyl and can be at any available position on the phenyl ring; and Y is lower alkyl; lower alkoxy; halo; cyano; nitro; lower haloalkyl having 1 through 4 carbon atoms and 1 through 3 of the same or different halo atoms; lower haloalkoxy having 1 through 4 carbon atoms and 1 through 3 of the same or different halo atoms; or lower haloalkylthio having 1 through 4 carbon atoms and 1 through 3 of the same or different halo atoms;

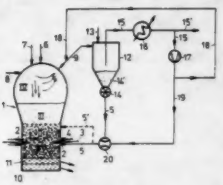
and compatible salts thereof.

4,978,387

PROCESS FOR THE PRODUCTION OF MOLTEN PIG IRON

Werner Kepplinger, Linz, Austria, assignor to Deutsche Voest-Alpine Industrienlagenbau GmbH, Fed. Rep. of Germany

Filed Oct. 25, 1989, Ser. No. 427,186
Claims priority, application Austria, Oct. 25, 1988, 2642/88
Int. Cl.[5] C21B *11/00*
U.S. Cl. 75—445 12 Claims



1. In a process for the production of molten pig iron by melt-reducing iron ores of various grain sizes containing an ore fraction A comprised of grain sizes corresponding to diameters of less than 0.2 mm, which process includes pre-reducing said iron ores by means of reducing gas so as to obtain pre-reduced material, completely reducing said pre-reduced material so as to obtain completely reduced material, and smelting said completely reduced material in a melter gasifier including a melting zone so as to obtain molten pig iron, the melter gasifier including an oxygen blowing plane, a tuyere plane and a coke bed region, the improvement comprising

separating said ore fraction A after pre-reduction from a fraction B comprised of particles having larger grain sizes by classification by means of reducing gas,

completely reducing said fractions A and B separately, and supplying said completely reduced fractions A and B to said melting zone of the melter gasifier.

4,978,388

Patent Not Issued For This Number

4,978,389

SURFACE TREATING AGENT AND THE PROCESS THEREFOR

Masayuchi Sato, Tokyo; Atsushi Mori, Chiba, and Mamoru Aizawa, Ichihara, all of Japan, assignors to Nippon Soda Co. Ltd., Japan

Continuation of Ser. No. 64,068, Jun. 18, 1987, abandoned. This application Feb. 27, 1989, Ser. No. 317,052
Claims priority, application Japan, Jun. 18, 1986, 61-140235
Int. Cl.[5] C09D *173/00;* C07F *7/28*
U.S. Cl. 106—14.41 10 Claims

1. A titanium fluoropolyether surface active agent selected from a monomeric form having the general formula

$$AaTiB(4-a)$$

where A is a fluoropolyether carboxy group, B is a hydrolyzable radical wherein neither HCl or HBr is generated by hy-

drolysis, and a is an integer from 1 to 3; and a polymeric form having the formula

$$A_aTiO(TiO)_bTiB_{(4-a)}$$

wherein A, B and a have the meanings given above and b is an integer from 0 to 4.

4,978,390

WASHABLE SOLID MARKING COMPOSITION

Colin M. Snedeker, Chapman Bath, Pa., assignor to Binney & Smith Inc., Easton, Pa.

Filed Oct. 27, 1988, Ser. No. 263,431

Int. Cl.[5] C09D 13/00

U.S. Cl. 106—19 **28 Claims**

1. A solid marking composition comprising:

(a) from about 7% to about 85% by weight of a polyethylene glycol resin; and

(b) from about 2% to about 10% by weight of a pigment, the balance comprising at least one material selected from the group consisting of a surfactant, said surfactant being other than a liquid at room temperature, a compatible viscosity modifier, a plasticizer, and a filler, said composition being substantially free of polyethylene glycol resins having an average molecular weight of less than about 7,000.

4,978,391

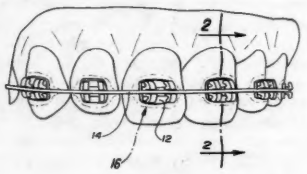
INTRAORAL MEDICAMENT DELIVERY AND PROCEDURE

Leslie A. Jones, York, Pa., assignor to Dentsply Management Corp., York, Pa.

Continuation of Ser. No. 120,280, Nov. 13, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 331,074

Int. Cl.[5] C09K 3/00; A61K 6/08; A61C 7/12

U.S. Cl. 106—35 **22 Claims**



1. A method for providing intraoral time released delivery of a medicament in the oral cavity comprising the steps of sequentially:

(a) affixing a base to a tooth by applying a dental adhesive to a tooth and/or said base and then touching said base to said tooth,

(b) applying a nontoxic prepolymer of a polyether, polyester, polyurethane, or mixtures thereof containing a medicament to said base said prepolymer comprising a compound of the general formula

$$R_1\text{+}A\text{+}R_1 \text{ wherein}$$

R_1 is $CH_2{=}C(R_3)C(=O)O\text{+}R_4\text{+}OC(=O)N-$ or

$CH_2{=}C(R_3)C(=O)O\text{+}R_4\text{+}NHC(=O)O-$ and

wherein

R_1 may be the same or different

R_3 is H, alkyl of 2–10 carbons, sub alkyl of 2–10 carbons, aryl of 6–14 carbon, sub aryl of 6–14 carbons, F, Cn and R_3 may be the same or different in each position;

R_4 is a divalent hydrocarbon radical or divalent sub hydrocarbon radical and may be straight or branched chain or acyclic or a combination thereof from 2–10 carbons; and is a polyurethane, polyether or polyester backbone; polysiloxanedimethacrylate, and polyorganosilylene, and

(c) polymerizing to affix the resulting polymeric material to said base and to produce a polymer which is elastomeric, soft and pliable.

4,978,392

CEMENTITIOUS COMPOSITIONS

Alan C. Kilbarger, Milford; William S. Kain, Cincinnati, both of Ohio, and Donald V. Kinsman, Ft. Thomas, Ky., assignors to Henkel Corporation, Ambler, Pa.

Filed Oct. 31, 1988, Ser. No. 264,742

Int. Cl.[5] C04B 24/08

U.S. Cl. 106—95 **20 Claims**

1. A cementitious composition having improved fluidity and workability at a reduced water content comprising cement, aggregate, sufficient water to effect hydration of the cement, and an ester of a polycarboxylic acid having 20 or more carbon atoms and 2 to 4 carboxyl groups and a polyoxyethylene glycol having an average molecular weight from about 200 to about 10,000; said polycarboxylic acid having at least about 25 percent of the available carboxyl groups esterified, said ester being present in an amount from about 0.0025 to about 0.5 weight percent, based on the weight of the total composition.

4,978,393

PROCESS FOR THE MANUFACTURE OF STOCKABLE DENSE ROAD ASPHALTS

René Maheas, 11 avenue du Coteau, Bouliac 33270 Floirac, France

Filed Mar. 7, 1989, Ser. No. 319,699

Int. Cl.[5] C08L 7/00

U.S. Cl. 106—281.1 **7 Claims**

1. Process for the manufacture of stockable dense road asphalt comprising gravel material having a diameter of essentially dust to about 10 to 30 mm (O/D) coated in a cutback or fluidified bitumen-based binder wherein the process comprises:

sorting said material into at least two granulometries, the first granulometry grouping together a first group of small material, the first group having a granulometry in the range from essentially 0 to a maximal diameter fixed between 2 and 4 mm and the other grouping a second group of the remaining material, the second group having a granulometry in the range from the maximal diameter of the first group to a diameter fixed between 10 and 30 mm;

coating said first group with a first bituminous binder emulsion, said first emulsion being a cationic cutback or fluidified bitumen emulsion with a fracture index greater than 120 and having residual binder viscosity, measured on a Standard Tar Viscosimeter (10 mm, 25° C.) of less than 50 seconds;

coating the second group with a second bituminous binder emulsion, said second emulsion being a cationic cutback or fluidified bitumen emulsion with residual binder viscosity, measured on a Standard Tar Viscosimeter (10 mm, 25° C.), of between about 1000 and 2000 seconds;

and then mixing said first and second groups for a few seconds.

4,978,394

METAL OXIDE COATED ALUMINUM PIGMENTS

Werner Ostertag, Gruenstadt, and Norbert Mronga, Dossenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,107
Claims priority, application Fed. Rep. of Germany, Apr. 21, 1988, 3813335
Int. Cl.[5] C09C 1/14, 1/62
U.S. Cl. 106—404 9 Claims

1. A metallically bright reflection pigment consisting of a substrate of plateletlike aluminum and a coating of titanium dioxide.

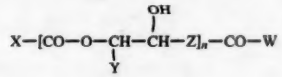
4,978,395

POLYMERIC DISPERSING AGENT

Giuseppe Canestri, Via Parisano, 84, 47037 Rimini (Forli), Italy

Filed Feb. 3, 1989, Ser. No. 305,751
Claims priority, application Italy, Feb. 10, 1988, 19364 A/88
Int. Cl.[5] C08K 5/04
U.S. Cl. 106—499 5 Claims

1. A dispersion in a liquid of from 30 to 75% by weight of solid particles which are insoluble in the liquid and from 3 to 19% by weight of disperant, which is a polyaddition product of the formula:

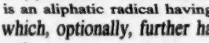


wherein

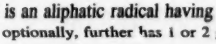
X is (a) residue of a resin acid, (b) residue of an aliphatic saturated or unsaturated carboxylic acid having from 1 to 25 C atoms, (c) aliphatic radical having from 7 to 24 C atoms and which optionally has from 1 to 3 groups of the formula:

or (d) a mixture of at least two of the foregoing;

Y is an aliphatic radical having from 1 to 10 C atoms and which, optionally, further has 1 or 2 groups of the formula:



Z is an aliphatic radical having from 6 to 15 C atoms and, optionally, further has 1 or 2 groups of the formula:



W is OR″, or O⁻M⁺ or NH—R‴;

n is an integer from 1 to 22;

one of R_1 and R_2 is OH, while the other is (a) residue of a resin acid, (b) residue of an aliphatic, saturated or unsaturated, carboxylic acid having from 1 to 25 C atoms or (c) residue of an aliphatic, saturated or unsaturated, amine having from 1 to 11 C atoms; the aliphatic chain of the acid or of the amine optionally being substituted by OR′ or SR′, by a secondary, tertiary or acylated amino group or by an esterified carboxylic group; or

R_1 and R_2 form a covalent bond or an oxygen bridge;

R′ is H or alkyl having from 1 to 4 C atoms;

R″ is H, optionally substituted aliphatic chain having from 1 to 18 C atoms or a resin acid polycondensate radical;

M^+ is a cation;

R‴ is an optionally-substituted aliphatic radical having from 3 to 101 C atoms; R″ and R‴ optionally being linked to an organic pigment by an ionic or covalent bond; and

wherein less than 25% of the groups X, Y and Z contain a —CH(R_1)—CH(R_2)— group wherein R_1 and R_2 together form an oxygen bridge.

4,978,396

PROCESS FOR PREPARING HIGH SOLIDS SLURRIES

Phillip M. Story, Yukon, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

Filed May 12, 1989, Ser. No. 351,061
Int. Cl.[5] C09C 1/36
U.S. Cl. 106—436 16 Claims

1. A process for preparing a high solids content pigment slurry consisting essentially of the steps of:

providing an aqueous, highly dispersed pigment slurry comprised of water, a first dispersing agent comprising an alkali metal phosphate compound and an untreated, nonflocculated titanium dioxide pigment said pigment being present in said slurry in an amount sufficient to provide a solids content in said slurry of at least about 20 percent by weight, said slurry being maintained at a pH level of about 8.0 and higher or about 4.0 and lower to prevent flocculation of said titanium pigment;

dewatering said highly dispersed pigment slurry under superatmospheric pressure conditions sufficient to produce a wet filter cake containing a solids content of said untreated, nonflocculated pigment of at least about 70 percent by weight; and

reslurrying said wet filter cake by adding thereto a second dispersing agent comprising a water soluble organic material whereby a pigment slurry having a pigment content of at least about 70 percent by weight is obtained.

4,978,397

PROCESS FOR PREPARING HIGH-PURITY LACTULOSE SYRUP AND THE SYRUP OBTAINED

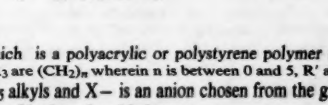
Renato Carobbi, via Dalmazia 168, Pistoia, and Franco Innocenti, via Repubblica Val d'Ossola 3, Bagno a Ripoli (FI), both of Italy

Continuation of Ser. No. 149,158, Jan. 27, 1988, abandoned. This application Apr. 27, 1989, Ser. No. 344,444
Claims priority, application Italy, Dec. 30, 1987, 23265 A/87
Int. Cl.[5] C13D 3/14, 3/12
U.S. Cl. 127—46.2 3 Claims

1. A process for preparing high-purity lactulose, comprising:

(a) diluting with water to a lactulose content of 15–25% weight by weight a syrup containing 45–55% weight by weight of lactulose and having a lactulose content on a dry substance basis of 74–85% weight by weight;

(b) pretreating the syrup thus diluted with bifunctional boron resins of formula



(I)

in which is a polyacrylic or polystyrene polymer matrix, R and R_3 are $(CH_2)_n$ wherein n is between 0 and 5, R′ and R_2 are C_1–C_5 alkyls and X− is an anion chosen from the group consisting of hydroxyl and halogens;

(c) neutralizing the syrup from stage (b) with a weakly basic resin,

(d) treating the syrup from stage (c) with ion exchange resins using a series of columns containing alternatively anion resins in OH form and cation resins in H^+form respectively, the pH value of percolated syrup being maintained between 8 and 10 by controlling syrup throughput between 6 and 8 volumes per hour per volume of ion exchange resin or alternatively with a series of columns containing strong anion exchange resins salified with anions selected from the group consisting of CO_3^{2-}, HCO_3^-, CH_3COO^- and $HCOO^{31}$, wherein the pH of the percolated syrup is maintained between 8 and 10 by control-

ling the syrup throughput between 1 and 2 volumes per hour per volume of ion exchange resin.

4,978,398

MAGNETICALLY ANISOTROPIC HOT-WORKED MAGNET AND METHOD OF PRODUCING SAME

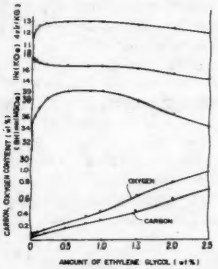
Katsunori Iwasaki, Kumagaya; Shigeho Tanigawa, Kounosu, and Masaaki Tokunaga, Fukaya, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,631

Claims priority, application Japan, Sep. 30, 1988, 63-247172

Int. Cl.[5] H01F 1/08

U.S. Cl. 148—101 9 Claims



1. A method of producing a magnetically anisotropic hot-worked magnet comprising the steps of: rapidly quenching a melt of an R-T-B alloy containing a transition metal T as a main component, a rare earth element R including yttrium, and boron B, to form thin ribbons or flakes; pulverizing said thin ribbons or flakes to form magnetic powder; and subjecting said magnetic powder to hot working to provide the resulting magnet with magnetic anisotropy, where the method includes the further step of mixing said magnetic powder with an additive composed of at least one organic compound having a boiling point of 150° C. or higher before said subjecting step.

4,978,399

METAL SURFACE TREATMENT WITH AN AQUEOUS SOLUTION

Kenji Kodama, and Yuzo Yamamoto, both of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan

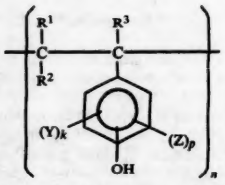
Filed Dec. 16, 1988, Ser. No. 285,858

Claims priority, application Japan, Jan. 4, 1988, 63-196; Jan. 4, 1988, 63-197; Jan. 4, 1988, 63-198

Int. Cl.[5] C23C 22/00

U.S. Cl. 148—250 9 Claims

1. A method for treating a surface of a metal article comprising a step of contacting the surface of the metal article with an aqueous solution containing at least one metal ion and an additive of organic polymer (K); wherein polymer (K) is a hydroxystyrene having formula (K):



(K)

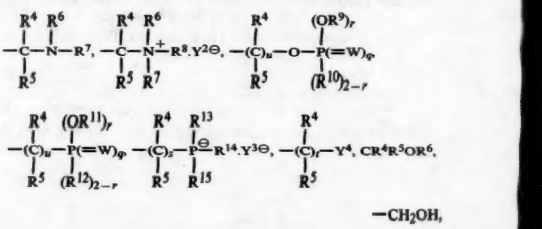
wherein

n is 3 or more and is a number necessary for said organic polymer represented by general formula (K) to have a weight-average molecular weight of up to 1,000,000; k is a number greater than 0 but not more than 2; p is a number from 0 to 2;

R^1 to R^3 are each H or an alkyl group having 1 to 5 carbon atoms;

Y is $-SO_3M$ or

wherein M is H, an alkali, an alkali earth metal, or an organic cation of an amine, Z is a member selected from the group consisting of $-Y^1$, $-OCH_3$,



$-CH_2OH$,

alkyl groups having 1 to 18 carbon atoms and aryl groups;

Y^1 and Y^4 are each a halogen;

$Y^{2\ominus}$ and $Y^{3\ominus}$ are each a counter ion;

W is S or O;

R^4, R^5 and R^8, which may be the same or different, are each a straight-chain or branched alkyl group, an alkyl group derivative such as a hydroxyalkyl group, an aromatic group, or H;

R^6 and R^7, which may be the same or different, are each a straight-chain or branched alkyl group, an alkyl group derivative such as a hydroxyalkyl group, an aromatic group, H, or together form a heterocyclic group with the nitrogen atom;

R^9 to R^{15}, which may be the same or different, are each a straight-chain or branched alkyl group, an alkyl group derivative, an aromatic group, or H;

q, s, t and u are each 0 or 1; and

r is 0, 1, or 2.

4,978,400

SYNERGISTIC COMPOSITE PYROTECHNIC MATERIAL

Paul W. Juneau, Jr., Norristown, and Howard Semon, Malvern, both of Pa., assignors to General Sciences, Inc., Plymouth Meeting, Pa.

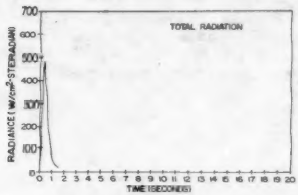
Filed Nov. 17, 1989, Ser. No. 439,067

Int. Cl.[5] C06G 45/02

U.S. Cl. 149—21 57 Claims

1. A pyrotechnic composite comprising a mixture of an alkaline earth metal sulfate, particulate boron and at least one additional particulate material which is capable of exothermically reacting with boron to yield an intermetallic compound, wherein at least 75 volume percent of said particulate boron has a diameter of less than about 40 microns, wherein at least 75 volume percent of said at least one additional particulate material has a diameter of less than about 50 microns, and wherein an exothermic reaction between said alkaline earth

metal sulfate, said particulate boron and said at least one particulate material results in a release of thermal radiation of at least



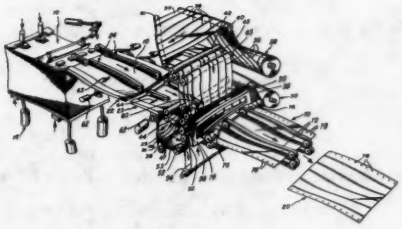
about 300 W/cm^2-Steradian and a release of visible light energy of at least about 1.0×10^4 LUX.

4,978,401

CARD ASSEMBLY METHOD

Jaime Bonomi, Stoughton, Mass., assignor to Bostec Systems, Inc., Canton, Mass.

Filed Mar. 14, 1989, Ser. No. 323,494
Int. Cl.[5] B65C 1/02; G01B 7/14
U.S. Cl. 156—64 2 Claims



1. A method of assembling a laminated card, comprising the steps of; providing a source of printed core material, feeding the core material to a laminating station, providing a source of an overlay web having arranged thereon a series of parallel-disposed magnetic stripes, feeding the overlay web to said laminating station, controlling both said aforementioned core material and web so as to feed them concurrently to form a lamination, and controlling the inter-positional relationship between the core material and overlay web to maintain a predetermined positional arrangement between the magnetic stripe and a predetermined position on the core material.

4,978,402

FORMATION OF FLEXIBLE LAMINATES BY BONDING A BACKING TO A PRE-COATED SUBSTRATE

Gerald Hallworth, Ramsbottom, England, assignor to The Dow Chemical Company, Midland, Mich.

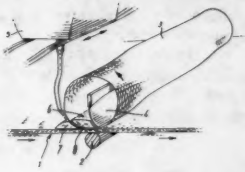
Continuation-in-part of Ser. No. 128,080, Dec. 3, 1987, which is a continuation of Ser. No. 828,528, Feb. 12, 1986, Pat. No. 4,752,510. This application Nov. 4, 1988, Ser. No. 267,381
Claims priority, application United Kingdom, Nov. 6, 1987, 8726104
The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.
Int. Cl.[5] B32B 31/12
U.S. Cl. 156—77 15 Claims

1. A method of forming a flexible laminate by bonding a backing layer to a pre-coated textile substrate, said method comprising the steps of:

moving the substrate with a guide arrangement relative to a rotatable transfer roller so that a back surface of the substrate is in contact with or in close proximity to the roller;

feeding fluent settable coating material to the roller to be deposited therefrom onto the said back surface of the substrate;

causing or allowing the deposited coating material to set so as to form a pre-coat on said back surface; and



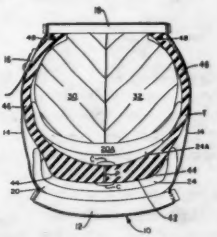
bonding a backing layer to said pre-coated back surface; characterised in that said transfer roller is a hollow perforated roller containing an internal doctor member; the fluent coating material is fed to the roller so as to form a well of the material between and freely in contact with the back surface and the doctor member through the perforated wall of the roller; and the spacing of the roller relative to the substrate and the pressure of the doctor member relative to the perforated wall of the roller are adjusted to give a desired thickness or density of the pre-coat.

4,978,403

TIRE REPAIR METHOD USING SOLID MANDREL HALVES

Larry R. Kinyon, Roanoke Rapids, N.C., assignor to Myers Industry, Akron, Ohio

Filed Aug. 29, 1989, Ser. No. 399,850
Int. Cl.[5] B29C 35/02, 73/06
U.S. Cl. 156—97 5 Claims



1. A method for repairing a tire which comprises:

(a) placing on an essentially horizontal supporting surface a harness having a pad;

(b) placing an air bag and a heat pad in that order on top of the harness pad;

(c) positioning a tire to be repaired on top of said harness, air bag and heat pad so that the area of the tire to be repaired is over said heat pad, said area to be repaired having an uncured patch composition applied thereto;

(d) placing on the inside of the tire, over the area to be repaired, a second heat pad, a second air bag and a pair of complementary mandrel halves in the order named thereby forming an assembly of said harness, air bags, heat pads and mandrel halves in which said mandrel halves

together extend from one sidewall to the other sidewall of the tire, said mandrel halves being of the same size each mandrel half comprising (1) a top surface, (2) a bottom surface, (3) a convex first side surface extending from said top surface to said bottom surface and having a contour essentially corresponding to that of the inside surface of the sidewall of said tire, (4) a second side surface extending from said top surface to said bottom surface, and (5) a pair of end surfaces, the respective second side surfaces being in contact with each other when said mandrel halves are placed on the inside of said tire, said mandrel being essentially rigid and capable of withstanding vulcanization temperature and pressure;

(e) securing the resulting assembly of said harness, air bags, heat pads and mandrel halves snugly; and

(f) applying heat and pressure sufficient to cure said patch composition so as to repair the tire.

4,978,404

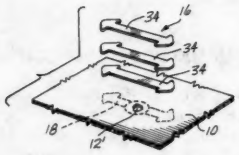
METHOD FOR REPAIRING A HOLE IN A STRUCTURAL WALL OF COMPOSITE MATERIAL

Everett A. Westerman, Jr., Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 21, 1986, Ser. No. 889,118

Int. Cl.[5] B32B *35/00*

U.S. Cl. 156—098 **16 Claims**



1. A method of repairing a structural wall of composite material which has been damaged by the formation of a hole in a region of the wall which must in use carry tension loads, comprising:

providing an insert constructed from a material that is capable of carrying tension loads, and which is dimensioned to span across the hole and extend beyond the hole on at least two opposite sides of the hole, said insert having a relatively narrow central portion and substantially wider end portions;

forming a cavity in the wall which in plan form is sized and shaped to snugly receive said insert, and is positioned so that the relatively narrow central portion of the insert will span across the hole in the wall and the substantially wider end portions of the insert will be embedded into the wall on opposite sides of the hole in a direction coinciding with the direction of tension loads in the wall, so that the end portions of the insert will interlock with the end portions of the cavity in the wall and tension loads will be carried by the insert from a region of the wall on one side of the hole, across the hole to a region of the wall on the opposite side of the hole;

placing the insert in said cavity; and

securing the insert in said cavity, and

further comprising dressing the hole in the wall to give the hole a smoothly curving edge, and a dimension across that is wider than the narrow central portion of the insert, and introducing a filler compound into such hole on opposite sides of the narrow central portion of the insert.

4,978,405

METHOD OF MANUFACTURING FIRE-RESISTANT SAFETY GLASS

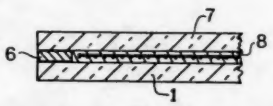
James A. A. Hickman, 14a Seaforth Drive, Edinburgh, Scotland

Filed Jul. 26, 1989, Ser. No. 391,544

Claims priority, application United Kingdom, Feb. 20, 1987, 8704007; Jul. 28, 1987, 8717850; Sep. 2, 1987, 8720617; PCT Int'l Appl., Feb. 17, 1988, PCT/GB88/00098

Int. Cl.[5] B32B *31/12, 17/10*

U.S. Cl. 156—107 **10 Claims**



1. A method of manufacturing a fire-resistant safety glazing product comprising the steps of positioning apart from 0.25 mm to 2.0 mm two sheets of glazing material; and bonding together the two sheets of glazing material with an interlayer of adhesive binder material having completely embedded therein a reinforcing wire mesh consisting of metallic wires welded together at intersecting or cross-over points, the bonding step comprises the steps of setting of the adhesive binder material between the two sheets of glazing material from an initial flowable condition to a final set condition, the adhesive binder material, when in its flowable condition, flowing around the reinforcing wire mesh causing positioning of the reinforcing wire mesh substantially centrally within the interlayer.

4,978,406

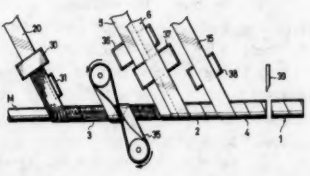
PROCESS FOR PRODUCING TUBE

Hiroyuki Nakano, Osaka, Japan, assignor to Showa Products Company, Osaka, Japan

Filed Apr. 25, 1989, Ser. No. 342,964

Int. Cl.[5] B31C *13/00*

U.S. Cl. 156—190 **5 Claims**



1. A process for producing a tube as formed around a mandrel, the tube comprising a strength imparting tubular body and a tubular lining member covering the inner surface of the tubular body and bonded to the body, the process comprising the steps of:

forming a multiplicity of projections on and a multiplicity of recesses in a synthetic resin surface of a lining sheet in the form of a strip, the recesses being positioned as distributed among the projections,

helically winding the lining sheet around a mandrel with a lap formed at one side edge of the sheet and with the synthetic resin surface positioned inside, so that the top ends of the projections contact a peripheral surface of the mandrel,

bonding the lap to the underlying portion of the wound sheet to form the tubular lining member, and

moving the tubular lining member axially of the mandrel in a direction to remove the member from the mandrel.

4,978,407

METHOD FOR PRODUCING LAMINATED PANELS HAVING FOLDS

Alberto Ardissone, Principality of Monaco, Monaco, assignor to Polistock N.V., Netherlands

Filed Jun. 23, 1989, Ser. No. 370,739
Claims priority, application United Kingdom, Jun. 24, 1988, 8815101
Int. Cl.[5] B32B 31/16
U.S. Cl. 156—216 8 Claims

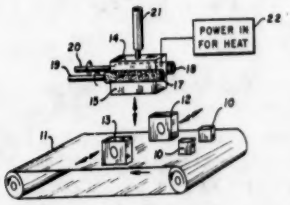
1. A method of producing a laminated panel having a backside formed of a normally rigid substrate in an essentially self-supporting thickness and a frontside formed of a differentially segmented cover layer bonded to said substrate by moldingly interconnecting a layer of said substrate in a moldable state and a differentially segmented sheet for providing said cover layer; said segmented sheet having at least two differing segments and at least one seam line between adjacent segments; the improvement comprising the step of forming, in a portion of said panel corresponding essentially to a predetermined position of the visible junction line between said differing segments in said frontside of said laminated panel, a fold to protrude from said backside and comprising a folded double layer of said segmented sheet as an inner fold portion and an outer fold portion formed of said substrate; said folded double layer having a length corresponding to at least about 100% of said self-supporting thickness of said substrate and including said seam line of said segmented sheet within said fold so as to compensate an off-set between said seam line of said segmented sheet and said predetermined position of said visible junction line on said laminated panel.

4,978,408

METHOD FOR HEAT SEALING THERMOPLASTIC ARTICLES

Russell L. Burford, St. Louis Park, and Raymond K. Newkirk, Mound, both of Minn., assignors to Forward Technology Industries, Inc., Minneapolis, Minn.

Continuation of Ser. No. 794,472, Nov. 4, 1985, abandoned. This application May 20, 1987, Ser. No. 51,914
Int. Cl.[5] B32B 31/20
U.S. Cl. 156—281 8 Claims



1. In a method for fusion bonding at least two articles composed of high melting point thermoplastic including the steps of bringing a fusable surface portion of each article to be bonded into engagement with a contact surface portion of a heated platen until each said fusable surface portion is fused, and thereafter bringing the fused surfaces together in face-to-face relationship, said method being characterized in that:

(a) each said contact surface portion of said platen is heated to a temperature substantially greater than the fusion temperature of the thermoplastic article and in the range of from 650° F. to 1000° F.;

(b) said fusable surface portions are simultaneously held in engagement with the contact surface portions until the fusable surface portions become fused;

(c) the fusable surface portions, once fused, are rapidly transferred into surface-to-surface contact with each other, and maintained in surface-to-surface contact until the fused surface portions become substantially solifified; and

(d) the contact surface portions of the heating platen are abraded to renew and expose said contact surfaces for engagement with fusable surface portions of each of a subsequent plurality of thermoplastic articles to be treated.

4,978,409

METHOD OF BONDING FIBERS TO HYDROGENATED NITRILE RUBBER

Akinori Fujiwara; Hiroshi Matsuoka; Susumu Onoe, and Kenji Kusaka, all of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Kobe, Japan

Filed Jun. 29, 1989, Ser. No. 373,062
Claims priority, application Japan, Jul. 6, 1988, 63-169883; Jul. 6, 1988, 63-169884; Jul. 6, 1988, 63-169885
Int. Cl.[5] C09J 5/04; D02G 3/48; B05D 5/10
U.S. Cl. 156—315 8 Claims

1. A method of bonding fibers to hydrogenated nitrile rubber which comprises:

the first step of treating fibers with an activating agent selected from the group consisting of polyisocyanates, epoxy compounds and silane coupling agents;

the second step of dipping the fibers into a resorcinol/formalin/latex solution;

the third step of treating the fibers with an adhesive composition which comprises (a) 1–90% by weight of polymers, based on the composition, the polymers containing halogens in amounts of 25–70% by weight based on the polymers, and (b) 10–99% by weight of polyisocyanates, aromatic polynitroso compounds or polyepoxy compounds; and

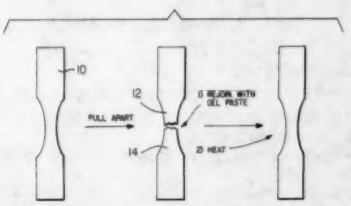
the fourth step of placing the fibers in close contact with hydrogenated nitrile rubber and vulcanizing the rubber together with the fibers.

4,978,410

METHOD FOR JOINING OF PREFIRED OR FIRED CERAMICS USING SOL GELS

David E. Clark, and Robert H. Krabill, both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

Continuation of Ser. No. 704,914, Feb. 25, 1985, abandoned. This application Jan. 8, 1987, Ser. No. 4,317
The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.
Int. Cl.[5] C03B 29/00; C09J 1/00, 5/06
U.S. Cl. 156—325 4 Claims



1. A method for joining portions of fired or unfired metal oxide containing ceramic bodies, comprising preparing a wet undried metal oxide gel from an alkoxide of a metal in said metal oxide containing ceramic bodies; applying a paste comprising said wet undried metal oxide gel to a portion of at least one of the ceramic bodies to be joined; contacting the portion

of the ceramic body to which said paste was applied with a portion of the other ceramic body and drying the paste.

4,978,411

PROCESS OF USING STARCH BASED CORRUGATING ADHESIVES

Craig Leake, Edison; Michael Foran, Somerville, and Jeffrey G. Atkinson, Neshanic Station, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Division of Ser. No. 207,350, Jun. 15, 1988, Pat. No. 4,912,209. This application Jan. 16, 1990, Ser. No. 466,091

Int. Cl.[5] C09J *103/00*; B32B *29/08*

U.S. Cl. 156—336 **9 Claims**

1. An improved process for making corrugated paperboard using a starch-based alkaline corrugating adhesive comprising an aqueous dispersion of a gelatinized carrier and a raw starch, wherein the improvement comprises employing a starch-based corrugating adhesive which contains an undried starch as the raw starch.

4,978,412

PLASMA PROCESSING DEVICE

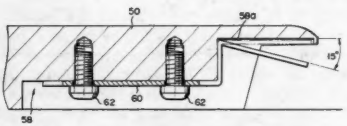
Makoto Aoki, Yokohama; Yoshifumi Tahara, Yamato, and Izumi Arai, Yokohama, all of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Apr. 6, 1990, Ser. No. 505,453

Claims priority, application Japan, Apr. 11, 1989, 1-90954

Int. Cl.[5] B44C *1/22*; C23C *14/00*; B05B *5/02*; C03C *15/00*

U.S. Cl. 156—345 **12 Claims**



1. A plasma processing device wherein an object to be processed can be mounted on a mount in the plasma process vessel, plasma-processed under such a state that the object is held between a clamping member and the mount at the peripheral rim thereof, and then handled after the object is released from the state of its being held between the clamping member and the mount, characterized in that the clamping member is provided with means for adding force to the object to separate it from the clamping member at least when it is to be released from its held state.

4,978,413

IN-LINE FILAMENT CLEANER AND ADHESIVE APPLICATOR

Daniel K. Schotter, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 25, 1989, Ser. No. 385,026

Int. Cl.[5] B65H *54/04*; B05C *3/12, 3/172*

U.S. Cl. 156—446 **9 Claims**

1. Apparatus for in-line cleaning of and application of adhesive to an optical fiber being wound from a storage roll onto a missile cannister, comprising:

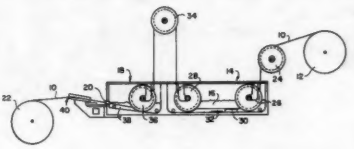
a first tank for containing a quantity of liquid cleaning solvent;

first pulley means for moving the fiber along a path in contact with the liquid cleaning solvent;

second pulley means located in the ambient air for receiving the fiber on leaving the cleaning solvent;

a second tank for containing a quantity of a liquid adhesive;

third pulley means for moving the fiber received from the second pulley means along a path through the liquid adhesive, said first, second and third pulley means being mounted on a member which is, in turn, pivotally mounted to swing the first and third pulley means into and out of the cleaning solvent and adhesive, respectively; and



gauging means for receiving the fiber after it has passed through the liquid adhesive, smoothing the adhesive to a prescribed thickness and applying consistently over the fiber surface.

4,978,414

APPARATUS FOR STRETCHING SILK INCLUDING MEANS TO MOVE CRAMP MEMBERS INDEPENDENTLY OF EACH OTHER

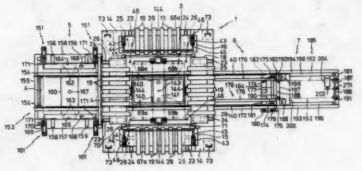
Yasuaki Ohtani; Isamu Kubo; Kohji Ohtake, and Kazuo Hayashi, all of Isesaki, Japan, assignors to Nippon CMK Corp.; Iwase Sangyo Co. and Itohdenki Kanto Hanbai Co., all of Isesaki, Japan

Filed Dec. 31, 1985, Ser. No. 815,212

Claims priority, application Japan, Jan. 18, 1985, 60-7252; Oct. 24, 1985, 60-238439; Oct. 28, 1985, 60-240806; Oct. 29, 1985, 60-241823

Int. Cl.[5] B29C *65/52*

U.S. Cl. 156—494 **1 Claim**



1. An apparatus for stretching silk on a silk screen printing frame comprising:

a silk cramp apparatus having four side cramp tables surrounding the frame and inwardly and outwardly slidably supported, and a support stand slideably supporting said cramp tables, a plurality of cramp members mounted on each cramp table and each having a silk cramp means and means for moving the cramp members inwardly and outwardly relative to a corresponding cramp table in a horizontal direction independently of each other, a frame elevator apparatus for urging the frame into contact with the silk from a lower side of the silk cramped by the cramp apparatus,

an adhesive applying apparatus for applying adhesive to the upper surface of the urged frame, a dryer apparatus for forcibly drying applied adhesive on the frame, and

a cutting apparatus for cutting the silk along the outer periphery of the frame.

4,978,415

APPARATUS FOR APPLYING LABELS TO ARTICLES

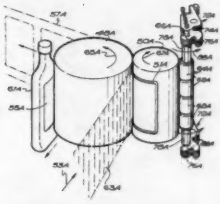
Richard H. Jones, Tadcaster, United Kingdom, assignor to John Waddington plc, Leeds, England

Continuation of Ser. No. 923,843, Oct. 28, 1986, abandoned. This application Oct. 25, 1988, Ser. No. 267,691

Claims priority, application United Kingdom, Oct. 20, 1985, 8526582; Apr. 12, 1986, 8608954

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—517 5 Claims



1. Apparatus for applying labels to articles which are moved sequentially through an application station, comprising:

feeding means for feeding through the apparatus a web with labels thereon and activated adhesive on one side thereof,

a severing station at which the labels are cut from the web, a drum and co-operating roller comprising a nip forming said severing station, said drum being an anvil, and die cutting edges on said co-operating roller, the cutting edges serving to cut the labels from the web by cutting through the adhesive side of the web and including a lubricating roller in tangential contact with the co-operating roller, support means for supporting the lubricating roller so that it is free to float towards and away from the co-operating roller, and

spring means for urging the lubricating roller against the co-operating roller, said lubricating roller carrying liquid lubricating medium which is applied to the co-operating roller as it rotates, keeping said die cutting edges clear of adhesive at least for a plurality of label cutting actions.

4,978,416

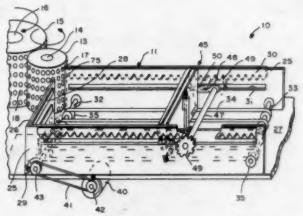
STACK FED LABELING MACHINE

Terry Potter, Sylvania; Philip J. Breno, Oregon, both of Ohio, and Lyn E. Bright, Ceres, Calif., assignors to B & H Manufacturing Company, Inc., Ceres, Calif.

Filed Oct. 28, 1988, Ser. No. 264,317

Int. Cl.[5] B65C *9/10, 9/14*

U.S. Cl. 156—571 2 Claims



1. Apparatus for dispensing labels or other sheet material in the form of precut segments, each segment having a flat shape defined by a front face, a rear face, an upper edge, a lower edge and two side edges, said edges being the boundaries of said faces, said segments being arranged adjacent one another in a horizontal stack with their front faces facing forwardly and their rear faces facing rearwardly, said apparatus comprising:

(a) a holder serving to hold such segments in a horizontal stack with their front faces facing forwardly and their rear faces facing rearwardly

(b) compressor means for applying pressure to the rear of the stack to cause the segments to move forwardly as the segments are dispensed

(c) forwardly moving belt means beneath the compressor means to move the segments forwardly, and slip clutch means connecting the compressor means with said belt means to move the compressor means forwardly as the segments are dispensed said slip clutch means serving automatically to engage the compressor means with and to disengage it from said belt means as said segments are dispensed thereby maintaining a pressure on the rear of said stack adequate to move it forwardly but serving also to disengage the compressor form the belt means to avoid excessive pressure

(d) said holder having at its front end an opening permitting removal of individual segments,

(e) a segment extractor in the form of a rotating vacuum wheel adjacent such opening and able, while rotating and exerting a vacuum, to extract each foremost segment from the stack onto its periphery and

(f) means for continuously rotating the vacuum wheel.

4,978,417

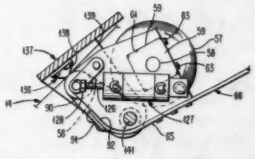
COMPOSITE TAPE LAYING MACHINE HAVING SCRAP REMOVAL AND METHOD

Michael N. Grimshaw, Milford; Stephen J. Albers, Norwood, and Ralph J. Rust, Cheviot, all of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Jul. 17, 1989, Ser. No. 380,573

Int. Cl.[5] B32B *31/00*

U.S. Cl. 156—574 11 Claims



1. An apparatus for laying a composite tape on a mold or the like from a tape assembly including a backing to which the composite tape is releasably adhered including:

supply means having a tape assembly including a composite tape and a backing to which the composite tape is releasably adhered;

storage means for storing the backing of the tape assembly;

advancing means for advancing the backing between said supply means and said storage means;

severing means for severing portions of the composite tape from each other without severing the backing, said severing means being disposed between said supply means and said storage means;

applying means for applying each selected severed portion of the composite tape to a mold or the like, said applying means being disposed between said severing means and said storage means;

removing means for removing each non-selected severed portion of the composite tape from the backing after the composite tape has been severed by said severing means and prior to said applying means;

and said removing means including:

an adhering material having a greater adherence to the composite tape than the backing has to the composite tape;

supply means having said adhering material;
storage means for receiving said adhering material;
said adhering material extending from said supply means to said storage means;
backing support means for supporting the backing during its travel between said severing means and said supply means;
selective moving means for selectively moving said adhering material into and out of engagement with each non-selected severed portion of the composite tape at the position of said backing support means to remove each non-selected severed portion of the composite tape from the backing onto said adhering material;
and material advancing means for advancing said adhering material from said supply means of said removing means to said storage means of said removing means at least when said adhering material is in engagement with each non-selected severed portion of the composite tape.

4,978,418

CONTROLLED ION IMPLANT DAMAGE PROFILE FOR ETCHING

George W. Arnold, Jr., Tijeras; Carol I. H. Ashby, Edgewood, and Paul J. Brannon, Albuquerque, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 18, 1988, Ser. No. 233,511
Int. Cl.[5] C23C 22/00; B05D 3/00
U.S. Cl. 156—628 8 Claims

1. A process for etching a pattern on the surface of a substrate, comprising:
irradiating said substrate stepwise in said pattern with ions having a plurality of ion energies to provide substantially uniform damage to said material throughout the depth of the ion-implanted material; and, after the irradiating is completed,
contacting the ion-implanted substrate with an etchant for etching said pattern.

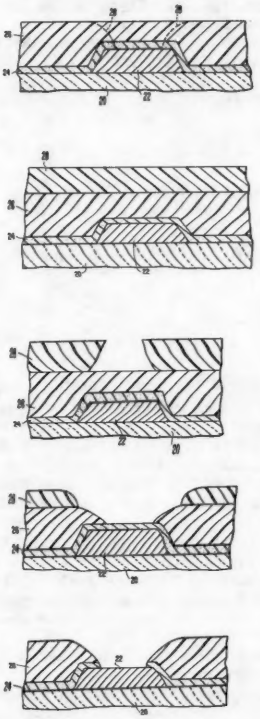
4,978,419

PROCESS FOR DEFINING VIAS THROUGH SILICON NITRIDE AND POLYAMIDE

Madan M. Nanda, Reston; Steven L. Peterman, and David Stanasolovich, both of Manassas, all of Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 917,350, Oct. 9, 1988, abandoned. This application May 31, 1988, Ser. No. 205,009
Int. Cl.[5] H01L 21/308
U.S. Cl. 156—643 4 Claims

1. In an integrated circuit chip having a plurality of semiconductor devices, a process for defining self-aligned vias through a silicon nitride layer and a polyimide layer comprising the following steps in the following order:
depositing a layer of silicon nitride over said semiconductor devices, said silicon nitride layer having a thickness in the range 0.2–1.0 microns;
depositing a layer of polyimide over said silicon nitride layer, said polyimide layer having a thickness greater than said silicon nitride layer and being in the range 0.6–2.5 microns;
depositing a layer of photoresist capable of forming sidewalls having a negative profile over said polyimide layer, said layer of photoresist having a thickness greater than said polyimide layer;
patternwise exposing said photoresist layer to radiation;
developing the exposed photoresist layer to form an image having negatively sloped sidewalls;
etching the silicon nitride layer with a mixture of CF_4 and O_2 using the patterned photoresist layer as an etch mask; and



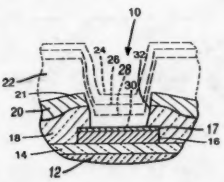
etching the silicon nitride layer with a mixture of CF_4 and H_2, using the etched polyimide layer as an etch mask.

4,978,420

SINGLE CHAMBER VIA ETCH THROUGH A DUAL-LAYER DIELECTRIC

Valerie A. Bach, Philomath, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 3, 1990, Ser. No. 460,421
Int. Cl.[5] B44C 1/22; C03C 15/00, 25/06
U.S. Cl. 156—643 20 Claims



1. A method of forming vias in a dual-layer dielectric including a silicon oxide layer formed on an integrated circuit substrate and a silicon nitride layer formed on the oxide layer, the method comprising:

forming a photoresist layer atop the nitride layer;

patterning the photoresist layer to define a via hole therein; and

successively etching each of the nitride and oxide layers through the via hole defined in the photoresist layer to form a via hole through the dual-layer dielectric;

etching the nitride layer including plasma etching the nitride layer selectively to the oxide layer.

4,978,421

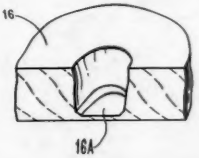
MONOLITHIC SILICON MEMBRANE DEVICE FABRICATION PROCESS

Ernest Bassous, Bronx; Joseph M. Blum, Yorktown Heights; Kevin K. Chan, Staten Island; Angela C. Lamberti, Putnam Valley; Constantino Lapadula; Istvan Lovas, both of Mahopac, and Alan D. Wilson, Armonk, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1989, Ser. No. 435,216

Int. Cl.[5] H01L 21/306; B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—645 7 Claims



1. A method for fabricating a monolithic silicon membrane structure comprising the steps of:

Step 1. providing a doped silicon region of a selected depth on a silicon wafer surface to define a membrane layer,

Step 2. masking a portion of said wafer surface opposite said membrane layer with an apertured mask layer leaving an area of said surface unmasked,

Step 3. removing said undoped silicon wafer material beneath said unmasked area to form a well to expose an area of said doped membrane layer corresponding to said unmasked area of said apertured mask layer,

Step 4. removing said apertured mask layer from said silicon wafer surface and cleaning said wafer structure to provide a monolithic silicon wafer structure including a well terminating in an integrated doped membrane layer.

4,978,422

METHOD FOR IMPROVING INSULATION RESISTANCE OF PRINTED CIRCUITS

Raymond A. Letize, West Haven, Conn., assignor to MacDermid, Incorporated, Waterbury, Conn.

Filed Mar. 20, 1990, Ser. No. 496,337

Int. Cl.[5] C23F 1/00; B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156—656 10 Claims

1. In a process for fabricating a printed circuit, wherein a printed circuit board composed of an insulating substrate material having a thin metal foil layer adhered to at least one planar surface thereof is selectively etched to produce a printed circuit having a predetermined pattern of conductive areas and insulating areas composed of said insulating substrate material, the improvement comprising contacting said insulating areas, after said etching, with an alkaline permanganate aqueous solution for a time and at conditions effective to remove from said insulating areas a sufficient quantity of metal species associated therewith so as to improve the electrical resistance afforded by said insulating areas in the printed circuit, and thereafter neutralizing residual manganese species on said printed circuit.

4,978,423

SELECTIVE SOLDER FORMATION ON PRINTED CIRCUIT BOARDS

Roy K. Durnwirth, Jr., Midlothian; John E. George, and Kim L. Morton, both of Richmond, all of Va., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 26, 1988, Ser. No. 249,133

Int. Cl.[5] H05K 3/06

U.S. Cl. 156—659.1 8 Claims

1. A method of fabricating printed circuit boards comprising the steps of:

forming a pattern of conductive material over an insulating substrate;

depositing a layer of solder over the pattern of conductive material;

depositing a photoresist mask layer by vacuum lamination over the resulting structure and developing the layer so as to expose areas of solder to be removed;

selectively removing the exposed areas of solder to expose portions of the conductive material; and

pumice scrubbing the portions of conductive material exposed by the selective removal of the solder while the photoresist mask protects the remaining solder.

4,978,424

DESCALING OF JACKETS OF GLASS-LINED INSTRUMENTS

Teruo Matsuda, Chiba; Masayoshi Miki, and Hiromu Ochi, both of Ehime, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 29, 1988, Ser. No. 237,209

Claims priority, application Japan, Aug. 28, 1987, 62-215566

Int. Cl.[5] C23F 1/44, 1/00

U.S. Cl. 156—664 6 Claims

1. A method for removing the scales from the inner steel surface of jackets of glass-lined instruments, comprising contacting said inner steel surface with an effective amount of a hydrochloric acid solution comprising at least one compound selected from the group consisting of laurylamine, lauryldimethylamine and propargyl alcohol to descale said inner steel surface.

4,978,425

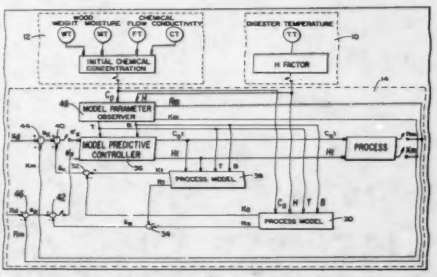
METHOD FOR CONTROLLING THE DEGREE OF COOKING IN A DIGESTER

Jeffrey A. Beller, Willoughby; Ralph K. Johnson, Highland Heights, both of Ohio; Roger Kammerer, Mercer Island, Wash.; Azmi Kaya, Akron, and Marion A. Keyes, IV, Chagrin Falls, both of Ohio, assignors to Elsag International B.V., Netherlands

Filed Jun. 13, 1989, Ser. No. 365,350

Int. Cl.[5] D21C 7/12

U.S. Cl. 162—49 4 Claims



1. A method for controlling the degree of cooking in a delignification digester comprising the steps of:

providing a flow of liquors and wood into a digester to form a mixture for reaction therein;

sensing the flow (F) of the liquors and wood into the digester;

monitoring with an analytical sensor a reagent concentration of the liquors flowing into the digester;

continuously measuring a temperature (T) of the mixture in the digester;

transmitting the measured temperature to a controller having means for providing values corresponding to a plurality of constants including an activation energy constant (E) for the digester reaction and a universal gas constant (R);

continuously calculating a reaction rate (k) of the digester with the controller as a function of temperature and said plurality of constants to obtain values therefor over time;

integrating said reaction rate (k) over time to obtain an H factor which corresponds to a degree of cooking within the digester;

transmitting the sensed flow of the liquors and wood along with the monitored reagent concentration of the liquors to the controller;

calculating with the controller an initial chemical concentration (C_o) of the liquor within the digester as a function of the sensed liquor flows and wood flow into the digester and the monitored reagent concentration of the same liquors;

generating with the controller a Kappa Number for cooking and a residual chemical concentration of the liquor with the H factor and the initial chemical concentration (C_o);

inputting desired values for the Kappa Number and the residual chemical concentration of the liquor into the controller;

comparing said generated Kappa Number and said residual chemical concentration measurements with said desired values for same to produce separate error signals representative of the respective differences between same; and

modifying said initial chemical concentration (C_o) of the liquor in the digester and cooking time versus temperature operating parameters of the digester in response to said error signals.

4,978,426

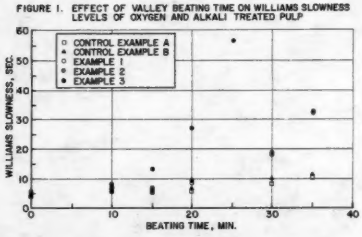
PRODUCTION OF HIGH STRENGTH LINERBOARD WITH OXYGEN AND ALKALI

Frank P. Lowry, Mt. Pleasant, S.C., assignor to Westvaco Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 17,866, Feb. 24, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 297,095

Int. Cl.[5] D21C *9/10*

U.S. Cl. 162—65 **7 Claims**



1. A method for producing linerboard paper from high yield chemical wood pulp having a kappa number from about 60 to about 120 by treating the pulp with oxygen and alkali at a temperature of from about 50° C. to about 100° C. and a pressure of up to about 150 psig in the absence of protectors to increase the refinability of the pulp and the strength properties of the paper by limiting the reduction in lignin and carbohydrate content int he pulp as determined by a kappa number reduction of no greater than 25% in the treated pulp.

4,978,427

WATER-SOLUBLE COPOLYMERS CONTAINING VINYLAMINE UNITS AS WET STRENGTH AND DRY STRENGTH AGENT FOR PAPER

Sigberg Pfohl, Speyer; Michael Kroener, Mannheim; Heinrich Hartmann, Limburgerhof, and Walter Denzinger, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 187,929, Apr. 29, 1988, Pat. No. 4,880,497, which is a division of Ser. No. 907,222, Sep. 15, 1986, Pat. No. 4,774,285. This application Sep. 5, 1989, Ser. No. 402,564

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534273

The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.

Int. Cl.[5] D21H *17/45*

U.S. Cl. 162—168.2 **11 Claims**

1. A process for making paper which has high dry strength and wet strength, comprising adding a hydrolyzed copolymer to a paper stock, wherein said hydrolyzed copolymer is prepared by a process, comprising:

(i) copolymerizing (a) N-vinylformamide in an amount of from 95 to 10 mole % with (b) an ethylenicaly unsaturated monomer selected from the group consisting of vinyl acetate, vinyl propionate, the C_1–C_4-alkyl vinyl ethers, N-vinylpyrrolidone and the esters, nitriles, and amides of acrylic acid and methacrylic acid in an amount of from 5 to 90 mole % to give a copolymer with formyl groups; and

(ii) hydrolyzing from 30 to 100 mole % of said formyl groups of said copolymer to form a hydrolyzed copolymer with amino groups;

wherein said hydrolyzed copolymer is added to said paper stock in an amount of from 0.1 to 5% by weight, based on dry fiber.

4,978,428

BEARING BLANKET FOR AN EXTENDED NIP PRESS HAVING LAMINATES OF DIFFERENT HARDNESSES

Dennis C. Cronin, Rockton, Ill., and David V. Lange, Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.

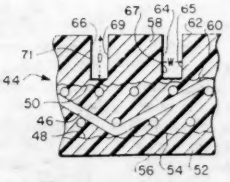
Continuation of Ser. No. 854,589, Mar. 14, 1986, Pat. No. 4,908,103. This application Dec. 14, 1989, Ser. No. 450,765

Claims priority, application PCT Int'l Appl., Oct. 3, 1985, PCT/US85/01953

The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.

Int. Cl.[5] D21F *3/02*

U.S. Cl. 162—358 **1 Claim**



1. A bearing blanket (**44**) for use in an extended nip press (**12**) in which the blanket (**44**) and felt (**14**) and a formed web (**16**) pass through an extended nip (**18**) defined by a rotatable press roll (**20**) and a cooperating hydraulically-loaded shoe (**22**), said blanket (**44**) comprising in combination:

a base (46) for imparting inherent rigidity to the blanket (44), said base (46) having a first and a second side (48,50);

a first laminate (52) extending along said first side (48) of said base (46), said first laminate (52) having an interface (54) disposed contiguous with said first side (48) of said base (46) and a face (56) which cooperates with the hydraulically-loaded shoe (22) of the extended nip press (12);

a second laminate (58) extending along said second side (50) of said base (46), said second laminate (58) having a surface (60) disposed contiguous with said second side (50) of said base (46), said second laminate (58) defining a boundary (62) such that said boundary (62) cooperates with the felt (14) of the extended nip press (12), said second laminate (58) defining a plurality of recesses (64,66) extending from said boundary (62) toward said base (46) for channeling fluid flow (68) from the felt (14) during passage of the blanket (44), felt (14) and web (16) through the extended nip (18); and

said laminates (52,58) having a hardness differential relative to each other, said first laminate (52) having a hardness within the range 80–93 Shore "A" for permitting flexing of said first laminate (52) during said passage through said extended nip (18), said second laminate (58) having a hardness of at least 94 Shore "A" such that crushing of said recesses (64,66) during said passage through said extended nip (18) is inhibited so that said fluid flow (68) is unimpeded.

4,978,429

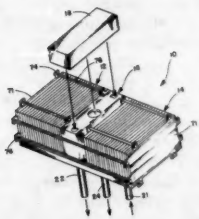
APPARATUS INCLUDING ITS OWN COMBINATION MANIFOLD/SUPPORT ASSEMBLY FOR PRODUCING A CONCENTRATE AND A DISTILLATE

Stephan B. Sears, 925 Peninsula Way; Dan M. Pomeroy, 4400 Fair Oaks Ave., both of Menlo Park, Calif. 94025, and Richard O. Rhodes, 490 Belvedere St., San Francisco, Calif. 94117

Filed Jan. 18, 1989, Ser. No. 298,656

Int. Cl.[5] B01D *1/26, 1/28*

U.S. Cl. 202—172 **16 Claims**



1. In a distillation apparatus including a plurality of adjacent, confronting plate members which together alternatively define a series of boiling and condensing chambers, a compressor, and means for fluid connecting said chambers and said compressor to one another so that feed water can first be converted to steam in said boiling chambers, then compressed in said compressor, and finally condensed into pure water in said condensing chambers, the improvement comprising a combination manifold/support assembly serving as a part of said fluid connecting means and as a means for supporting said confronting plate members, said assembly including

(a) a structural shell,

(b) means connecting said plate members directly to said shell such that the latter is substantially the sole support of said plate members, and

(c) structural reinforcing means located within and connected to internal surfaces of said shell for reinforcing the latter, said structural reinforcing means and adjacent internal surfaces of said shell together defining a number of internal manifolds forming part of said fluid connecting means.

4,978,430

METHOD FOR DEHYDRATION AND CONCENTRATION OF AQUEOUS SOLUTION CONTAINING ORGANIC COMPOUND

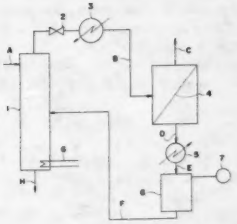
Kanji Nakagawa; Yoshio Asakura; Shigeru Yamamoto; Kohei Ninomiya, and Masayuki Kinouchi, all of Ichihara, Japan, assignors to UBE Industries, Ltd., Ube, Japan

Continuation of Ser. No. 7,128,818, Dec. 1, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,878

Claims priority, application Japan, Dec. 6, 1986, 61-290832; Jan. 12, 1987, 62-4730; Mar. 6, 1987, 62-51469; Sep. 11, 1987, 62-228193

Int. Cl.[5] B01D *3/00, 13/00*

U.S. Cl. 203—014.000 **16 Claims**



1. A method for dehydration and concentration of an aqueous solution containing an organic compound which is in the form of a liquid at 25° C. and has a boiling point of not higher than 200° C., comprising the steps of:

evaporating the aqueous solution to produce a gaseous mixture comprising vapor of the organic compound and vapor of water;

selectively separating the water vapor from the gaseous mixture by bringing the gaseous mixture into contact with a first side of an aromatic polyimide gas separation membrane at a temperature of 70° C. or higher to cause selective permeation of water vapor through the membrane to a second side whereby the water vapor passes selectively into the second side of the membrane, while the gaseous mixture from which water content is reduced is left on the first side where the gaseous mixture was introduced; and

recovering the gaseous mixture from which water vapor content is reduced from the first side of the membrane.

4,978,431

CONTINUOUS ELECTROPLATING OF CONDUCTIVE FOAMS

James R. Brannan, Perry; Andrew S. Bean, Willoughby; Anthony J. Vaccaro, Mentor, and James J. Stewart, Chardon, all of Ohio, assignors to ELTECH Systems Corporation, Boca Raton, Fla.

Filed Aug. 7, 1989, Ser. No. 390,033

Int. Cl.[5] C25D *7/06*

U.S. Cl. 204—28 **16 Claims**

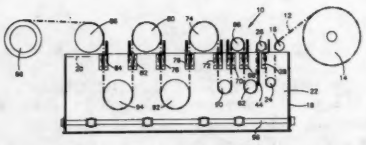
1. A process for continuously electroplating a strip of conductive reticulated foam which comprises the steps of:

(a) providing an electroplating bath;

(b) positioning a first cathode roll outside of said electroplating bath;

(c) positioning a first anode within the electroplating bath, said first cathode roll and first anode defining a first plating zone; and

(d) introducing said strip of conductive reticulated foam into said electroplating bath and guiding said strip so that it



travels past said first anode prior to contacting said first cathode roll.

4,978,432

METHOD OF PRODUCING PROTECTIVE COATINGS THAT ARE RESISTANT TO CORROSION AND WEAR ON MAGNESIUM AND MAGNESIUM ALLOYS

Edith L. Schmeling, Brühl-Badorf; Benno Röschenbleck, Osnabrück, and Michael H. Weidemann, Kerpen-Horrem, all of Fed. Rep. of Germany, assignors to Electro Chemical Engineering GMBH, Aug, Switzerland

Filed Mar. 9, 1989, Ser. No. 321,431

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808609

Int. Cl.[5] C25D *11/30*

U.S. Cl. 204—58.4 **19 Claims**

1. A method of producing a protective coating that is resistant to corrosion and wear on magnesium or a magnesium alloy by anodic oxidation, comprising immersing the magnesium or magnesium alloy in a low-alkali aqueous electrolyte bath containing

(a) borate or sulfate anions and

(b) phosphate and fluoride or chloride ions and buffered with ammonia or an amine to a pH of about 5 to 11, applying a direct current to the bath, and pulsing the direct current, whereby on the surface of the magnesium or its alloy there is formed magnesium ammonium phosphate and magnesium fluoride or magnesium chloride.

4,978,433

METHOD FOR RECOVERING SILVER FROM PHOTOGRAPHIC PROCESSING SOLUTION

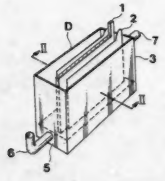
Haruhiko Iwano, and Fumio Nakagawa, both of Minamiashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 4, 1989, Ser. No. 332,902

Claims priority, application Japan, Apr. 5, 1988, 63-83505

Int. Cl.[5] C25B *1/00, 15/00;* **C02F** *1/46;* **C25C** *1/22*

U.S. Cl. 204—92 **20 Claims**



1. A method for recovering silver from a silver-containing photoprocessing waste solution derived from the processing of silver halide color photographic materials and including thiosulfate and iron complex salts, which comprises electrolyzing said waster solution under the condition that the applied voltage between a pair of electrodes is set at or higher than the potential at which the generation of sulfide ion takes place, said electrolysis being continued to an extent that a substantial amount of thiosulfate initially present is decomposed and the photoprocessing waste solution is not suitable for reuse as a photoprocessing solution.

2. The method as claimed in claim 1, wherein the precipitate of silver sulfide is formed in an electrolytic cell.

4,978,434

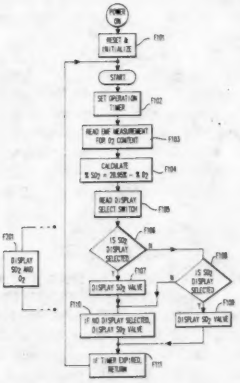
APPARATUS AND METHOD FOR MEASURING SO_2 USING A ZIRCONIUM OXIDE ANALYZER

James E. Jones, Wadsworth, Ohio, and Clifford Y. Scott, Park Ridge, N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 26, 1989, Ser. No. 302,154

Int. Cl.[5] G01N *27/407*

U.S. Cl. 204—153.1 **7 Claims**



6. A method of determining an amount of a particular constituent of the flue gas emissions resulting from a combustible process utilizing a fuel of known composition, said constituent amount determining method comprising the steps of:

oxidizing such combustible process with a known composition;

measuring an amount of excess oxygen resulting from such combustible process;

determining a second measurement of such particular constituent as a function of such measurement of excess oxygen, such second measurement being based on such combustible process having as the essential elements making up such flue gas constituents, such amount of such particular constituent and such excess oxygen in a known proportion;

displaying such amount of such second measurement in a selectively alternating relationship with a corresponding display of such amount of excess oxygen; and

defaulting to a display of such second measurement in the absence of a selection between such second measurement and such amount of excess oxygen.

4,978,435

FREE CHLORINE REMOVAL PROCESS

Jean-Jacques Masini, Chaponost, and Bertrand Collier, Saint Genis Laval, both of France, assignors to Atochem, Puteaux, France

Filed Aug. 24, 1988, Ser. No. 235,906

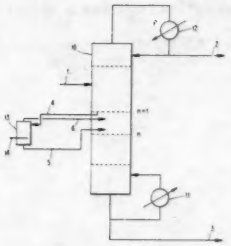
Claims priority, application France, Aug. 27, 1987, 87 11990

Int. Cl.[5] B01J *19/08;* **C07C** *17/10, 17/38*

U.S. Cl. 204—157.94 **9 Claims**

1. A process for the removal of free chlorine values from an admixture of HCl, free chlorine and at least one chloro-unsaturated compound comprising introducing the admixture

into a stripping zone from a distillation column for separating HCl from the admixture, radical chlorinating the admixture in



the stripping zone, and returning the chlorine free admixture to the distillation column.

4,978,436

CORONA-DISCHARGE TREATED RELEASE FILMS

Peter Y. Kelly, Kingston, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed Aug. 3, 1989, Ser. No. 388,926

Claims priority, application United Kingdom, Aug. 5, 1988, 8818689

Int. Cl.[5] H05F *3/00*; B29C *35/10*

U.S. Cl. 204—165 **5 Claims**

1. A process for the formation of a film having release characteristics, said process comprising:

(a) admixing in an extruder a composition comprising (i) a polyolefin in molten form, (ii) a dimethyl polysiloxane having functional end-groups, (iii) an agent for the grafting of vinyl silane compounds onto the polyolefin, (iv) at least one vinyl silane compound in an amount that is equal to or in excess of the stoichiometric amount that may be grafted onto the polyolefin using the grafting agent of (iii), and (v) a moisture curing agent;

(b) extruding said composition through a die at a temperature above the melting point of the polyolefin and so as to effect grafting of the vinyl silane onto the polyolefin;

(c) subjecting the film thus formed to a corona discharge; and

(d) subjecting the resultant film to moisture.

4,978,437

METHOD OF APPLYING OPTICAL COATINGS OF SILICON COMPOUNDS BY CATHODE SPUTTERING, AND A SPUTTERING CATHODE FOR THE PRACTICE OF THE METHOD

Peter Wirz, Waldernbach, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau I, Fed. Rep. of Germany

Continuation of Ser. No. 729,294, May 1, 1985 abandoned.

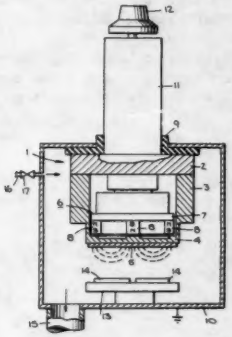
This application Jan. 27, 1987, Ser. No. 9,075

Claims priority, application Fed. Rep. of Germany, May 12, 1984, 3417732

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—192.23 **2 Claims**

1. Method for applying optical coatings of compounds of silicon to substrates by reactive cathode sputtering of siliceous target materials, comprising: sputtering as the target material a cast and solidified-from-the-molten-state polycrystalline silicon formed body of at least 99% silicon with at least one dopant selected from the group consisting of boron, antimony, phosphorus and arsenic, said silicon formed body containing said at least one dopant only in the range such that said silicon formed body has a specific resistance of 0.5 to 10 ohms×centimeter by direct current in an atmosphere containing the reaction gas.



4,978,438

ELECTROLYTIC CELL

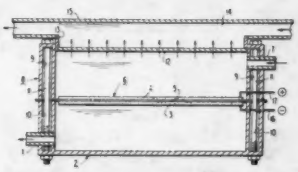
Takayuki Shimamune, Tokyo; Yoshinori Nishiki, and Shuji Nakamatsu, both of Kanagawa, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed May 16, 1989, Ser. No. 352,427

Claims priority, application Japan, May 16, 1988, 63-118915

Int. Cl.[5] C25B *9/00, 15/08, 13/00*

U.S. Cl. 204—265 **4 Claims**



1. An electrolytic cell comprising:

an anode compartment separated from a cathode compartment by a diaphragm; and

a gas-permeable and liquid-impermeable window formed in said anode and said cathode compartment, or formed in said anode or said cathode compartment,

wherein said window is formed such that a gas evolved in said anode or cathode compartment or gases evolved in these two compartments are allowed to pass through said window to make contact with a fluid to be treated, said fluid being located outside said electrolytic cell and flowing through a pipe having a cut-out formed to ensure contact between said fluid and said window, to thereby treat said fluid.

4,978,439

DESULPHURISATION USING SOLID SORBENTS

Peter J. H. Carnell, Stockton-on-Tees, and Patrick J. Denny, Croft-on-Tees, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 17, 1989, Ser. No. 311,830

Int. Cl.[5] C10G *25/00*

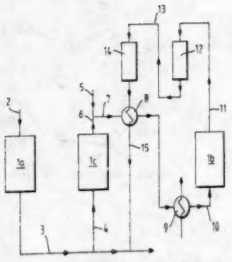
U.S. Cl. 208—91 **10 Claims**

1. A process for the production of a desulphurised product stream from a sulphur compound-laden feedstock stream,

wherein at least some of said sulphur compounds are organic sulphur compounds, comprising:

(a) subjecting said feedstock stream to a separation stage to give a sulphur compound-laden concentrate stream and a product stream of reduced sulphur content;

(b) passing said concentrate stream over a hydro-desulphurisation catalyst, thereby converting sulphur in organic sulphur compounds in said concentrate stream to hydrogen sulphide and forming a hydrogen sulphide-containing stream;



(c) removing hydrogen sulphide from said hydrogen sulphide-containing stream, thereby producing an effluent stream of reduced sulphur compound content; and

(d) adding said effluent stream to the product stream; and in which process hydrogen, or a compound that decomposes thereto in the presence of the hydro-desulphurisation catalyst, is present in, or is added to, the concentrate stream before passage thereof through the hydro-desulphurisation catalyst.

4,978,440

QUENCHED CATALYTIC CRACKING PROCESS

Frederick J. Krambeck, Cherry Hill; Joe E. Penick, Princeton, both of N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 272,196, Nov. 16, 1988, abandoned, which is a continuation-in-part of Ser. No. 666,533, Oct. 30, 1984, abandoned. This application Jan. 8, 1990, Ser. No. 463,831

Int. Cl.[5] C10G *11/18*

U.S. Cl. 208—113 **20 Claims**

1. In a fluidized catalytic cracking process wherein a fluidizable catalyst cracking catalyst and a hydrocarbon feed are charged to a reactor riser at catalytic riser cracking conditions to form catalytically cracked vapor product and spent catalyst which are discharged into a reactor vessel having a volume via a riser reactor outlet equipped with a separation means to produce a catalyst lean phase comprising a majority of said cracked product, and a catalyst rich phase comprising a majority of said spent catalyst, said catalyst rich phase is discharged into a dense bed of catalyst maintained below said riser outlet and said catalyst lean phase is discharged into said vessel for a time, and at a temperature, which cause unselective thermal cracking of the cracked product in the reactor volume before product is withdrawn from said vessel via a vessel outlet, the improvement comprising addition, after riser cracking is completed, and after separation of cracked products from catalyst, of a quenching stream into said vessel above said dense bed of catalyst, via a quench stream addition point which allows the quench stream to contact at least a majority of the volume of the vessel above said dense bed.

4,978,441

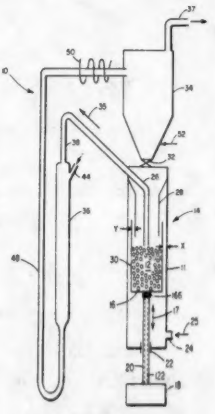
LABORATORY FCC RISER AND PARTICULATE DELIVERY SYSTEM THEREFOR

John S. Buchanan, Hamilton Square, and Hans J. Schoennagel, Pennington, both of N.J., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Jul. 15, 1988, Ser. No. 219,122

Int. Cl.[5] C10G *11/00*

U.S. Cl. 208—113 **22 Claims**



1. An apparatus for delivering a plurality of solid particulate matter comprising:

a cylinder;

a piston mounted so as to be reciprocally movably within said cylinder said piston being sized and shaped so as to define a clearance between itself and said cylinder;

means for effecting relative reciprocal motion between said piston and cylinder;

a source of solid particulate on one side of said piston;

a source of pressurized fluid on a side of said piston opposite said one side;

means to operatively connect the source of pressurized fluid to said one side of said piston so that said fluid flows through said clearance;

an exit tube for conveying said solid particulate matter from said cylinder.

4,978,442

MAGNETIC SEPARATOR HAVING HIGH RATE OF FIELD CHANGE CAPABILITY

James A. Tillotson, III, Los Altos, and Kenneth M. Crowe, Richmond, both of Calif., assignors to Pacific Electric Motor Co., Oakland, Calif.

Continuation of Ser. No. 166,295, Mar. 8, 1988, abandoned. This application Aug. 24, 1989, Ser. No. 399,381

Int. Cl.[5] B03C *1/02, 1/14*

U.S. Cl. 209—215 **4 Claims**

1. A combination of a large magnet for classifying magnetic particles from a passing fluid stream of magnetic and nonmagnetic particles, said large magnet including a central canister having a diameter exceeding 60-inches;

first and second manifolds for communicating said passing fluid stream of magnetic and nonmagnetic particles through said canister;

magnetic coils placed around said canister for inducing a magnetic field for effecting the classification, said magnetic field passing through said canister;

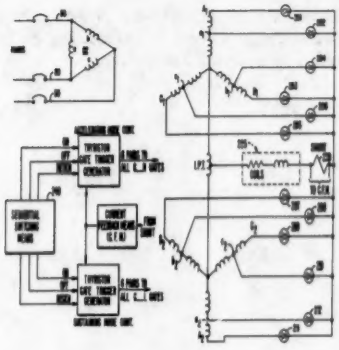
a magnetic field conducting core surrounding said canister and coils, said core including at least 6 side-by-side beams having solid interiors for the conduction of said magnetic field, said beams placed on the top and on the bottom of said magnetic core to form a magnetic field conducting path around said coils;

a power supply for driving direct current through said coils

to induce upon said magnet through said coils a classifying magnetic field, said power supply having communication to alternating electrical current input, the improvements to said power supply comprising in combination:

a first solid state rectifier circuit, said first solid state rectifier circuit sized with respect to said canister, coils, and magnetic field conducting core to drive an immediate voltage across said coils which would ultimately induce a current at an amperage in excess of that current required for maintaining said magnet at said field for classification of said magnetic particles from said nonmagnetic particles;

a second solid state rectifier circuit, said second solid state rectifier circuit sized with respect to said canister, coils, and magnetic field conducting core to drive a voltage



across said coils which will induce a current through said coils at an amperage required for maintaining said magnet field at said classifying field;

first power supply drive means operatively connected to said first solid state rectifier circuit to drive said coils when said magnet is initially imposed with a magnetic field; and,

second power supply drive means operatively connected to said second solid state rectifier circuit array and said first power supply drive means for switching off said first power supply drive means and on said second solid state rectifier circuit array when said first power supply approaches a rate of current flow required to maintain the classifying magnetic field of said magnet whereby said magnet is accelerated to its full classifying field.

4,978,443

SEPARATOR DISC

Stephen L. Cashman, Columbia Heights, and Edward L. Commers, Brooklyn Center, both of Minn., assignors to Carter-Day Company, Minneapolis, Minn.

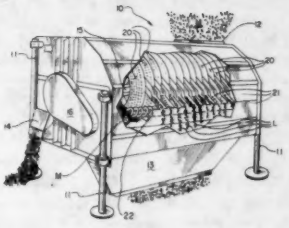
Filed May 18, 1989, Ser. No. 353,808

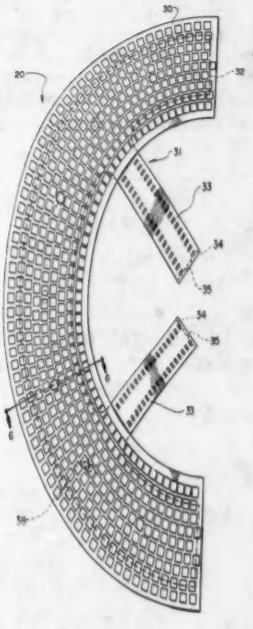
Int. Cl.[5] B07B *5/00*

U.S. Cl. 209—684 **8 Claims**

1. In a disc separator for separating a mixture of particles according to particle size, characterized by a series of spaced, parallel discs partially submerged in the mixture for rotation on a common axis, each of the discs having a series of pockets distributed substantially uniformly over the exposed plane surface thereof for lifting from the mixture particles of a certain size lodged therein as the discs pass through the mixture, and dumping the particles above the mixture as the discs rotate to thereby separate said particles from larger particles in the mixture, the improvement comprising:

discs formed of a castable polyurethane material having a hardness in the range of 50–100 on the Shore "A" scale, a





static dissipative conductivity rating and a non-porous finish.

4,978,444

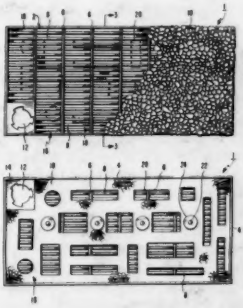
WATER PURIFIER FOR AQUARIUMS

Joseph L. Rommel, 76 A Brandywyne East, Brielle, N.J. 08730

Filed Jul. 14, 1989, Ser. No. 380,193

Int. Cl.[5] B01D *29/05, 35/02*

U.S. Cl. 210—169 **19 Claims**



1. An aquarium purifier system comprises a porous raised platform member adapted to lie over the bottom of an aquarium, water circulating and filtering means for permitting its passage of water passing from the aquarium through the plat-

form to be removed from under the platform for filtration thereof and return to the aquarium, a patterned bacterial growth and retention member secured to the underside of the platform said member having porous land areas for the retention and growth of waste removing, nitrogen fixing bacteria and particle entrapment and open areas which permits the passage of large waste particles to pass therethrough for removal through said water circulating and filtering means.

19. An aquarium purification system comprising a platform which conforms to the area of the bottom of an aquarium tank and means extending from the platform for keeping said platform raised from the bottom of the tank, said platform having openings to allow the flow of water therethrough and said platform including at least one opening adapted for securing a lift-tube thereto, at least one lift tube secured to said platform at each lift tube opening in said platform, a porous bacterial growth and retention member secured to the underside of said platform said member having land areas and a plurality of openings therethrough and means for coupling said lift tube to an external pump and filter for causing water in the aquarium to be circulated in a manner such that the water passes through the platform and bacterial growth and retention members and thence up the lift tube through an external filter and then back to the tank.

4,978,445

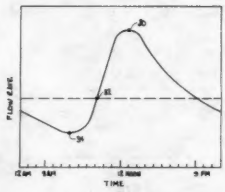
AERATION CHAMBER FOR A SEWAGE TREATMENT SYSTEM

Sam Long, 3046 N. 40th St., Kansas City, Kans. 66104

Continuation of Ser. No. 113,062, Oct. 26, 1987, abandoned. This application Feb. 6, 1990, Ser. No. 475,764

Int. Cl.[5] C02F *3/14*

U.S. Cl. 210—195.3 **7 Claims**



1. In an activated-sludge sewage treatment plant, a hybrid aeration chamber comprising:

inlet means for introducing sewage influent into said aeration chamber;

a primary, complete-mix section sealably connected to said inlet means for receiving said sewage influent, and comprising a mixing basin, and a mixing circulator and aeration diffuser means for treating the influent by aeration and mixing sufficient to provide an effluent having a biological oxygen demand of less then 75 parts per million;

first connecting means for sealably connecting said primary, complete-mix section with a secondary, hydraulic plug-flow section, said connecting means further providing conduit means for removing said effluent from said primary section and introducing said effluent into said secondary section;

said secondary, hydraulic plug-flow section comprising an elongated, relatively narrow aeration basin and aeration diffuser means for treating the influent by introduction of air thereto and said effluent flows through said secondary section to progressively reduce the biological oxygen demand and thereby provide a final, treated effluent having a biological oxygen demand of less than 20 parts per million;

clarifier means for receiving said final, treated effluent from said secondary section and clarifying the same, and second connecting means for sealably connecting said secondary section with said clarifier means, said second connecting means further providing conduit means for removing said final, treated effluent from said secondary section and introducing said final treated effluent into said clarifier means;

first outlet means sealably connected to said clarifier means for discharging and final, treated effluent from said clarifier means; and

second outlet means sealably connected to said clarifier means for discharging excess biological sludge from said clarifier means.

4,978,446

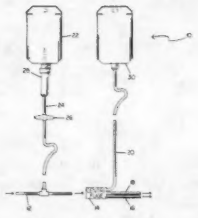
STERILE BLOOD COMPONENT COLLECTION

Donn D. Lobdell, Englewood, Colo., assignor to Cobe Laboratories, Inc., Lakewood, Colo.

Continuation of Ser. No. 322,097, Mar. 10, 1989, abandoned, which is a continuation of Ser. No. 89,493, Aug. 26, 1987, abandoned. This application Jan. 18, 1990, Ser. No. 467,034

Int. Cl.[5] B01D *35/02, 36/00, 63/08, 65/00*

U.S. Cl. 210—206 **8 Claims**



1. Apparatus for collecting blood components comprising

a sterile fluid flow line for receiving blood from a donor,

a blood separator including a disposable separation channel connected to said flow line to receive and separate said blood,

a blood component collection container connected to said separator via an outlet line,

a first supply line connected at one end to supply solution to said sterile fluid flow line, the other end of said supply line being connected to a connector adapted to be connected to a source of said solution, and

a first filter on said supply line that includes means for permitting passage of said solution and blocking passage of bacteria,

said sterile fluid flow line, first supply line, separation channel, outlet line, and blood component collection chamber being permanently connected together to maintain a closed, bacteria-free system downstream of said filter,

whereby said source of solution can be connected to said connector at the time of use without bacteria being transmitted into said sterile flow line, separator and collection container.

4,978,447

SELF-PROPELLED APPARATUS FOR CLEANING A WATER TREATMENT TANK

Ford W. Hall, Lexington, Ky., assignor to Ford W. Hall Company, Lexington, Ky.

Filed Jan. 26, 1990, Ser. No. 470,743

Int. Cl.[5] B01D *21/18*

U.S. Cl. 210—241 **12 Claims**

1. An apparatus for cleaning algae and other debris from a circular water treatment tank including a central influent, a service walkway, a peripheral baffle having inside and outside

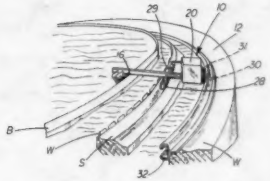
surfaces, a substantially circular weir, a substantially circular spillway and a clean water flow channel, comprising:

carriage means;

means mounted on said carriage:

means for driving said carriage means in a path of movement about the periphery of said treatment tank;

means for guiding said carriage means as it is driven;



cleaning means connected to said carriage means and adapted to engage and clean said baffle, weir, spillway and/or flow channel; and

directional control means for automatically controlling the direction of operation of said drive means and thereby the direction of movement of said carriage means around said treatment tank, said directional control means including means for sensing an obstruction in the path of movement of said carriage means.

4,978,448

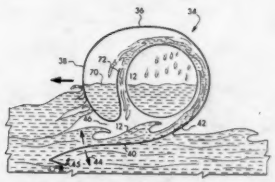
SYSTEM FOR RECOVERY OF FLOATING MATERIAL FROM THE SURFACE OF A BODY OF WATER

Nikiforos Terokomos, P.O. Box 317, Parksville, N.Y. 12768

Filed Oct. 10, 1989, Ser. No. 419,539

Int. Cl.[5] E02B *15/04*

U.S. Cl. 210—242.3 **67 Claims**



1. An apparatus for recovering floating material from the surface of a body of water, said apparatus comprising a housing; said housing comprising an elongated scoop with a substantially spiral shaped cross-section;

said scoop having a front leading edge surface and a lower tail section to form an opening for said floating material to enter said housing in a substantially laminar flow;

an elongated frame having an outer periphery, said frame mounted rotatably on said housing so the lower section of the periphery of said frame rotates through said floating material;

means mounted on the periphery of said frame to separate said material from said surface;

means mounted on said apparatus adjacent said periphery of said frame to remove said material from said separating means; and

means in said housing to retain said removed material.

4,978,449

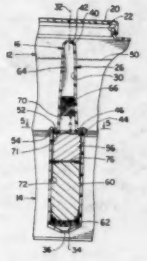
WATER PURIFIER WITH AIR-PASSING RETAINER ABOVE WATER INLET

Frank M. Devine, and Rod D. Shapiro, both of 1933 S. Broadway, L.A. Mart, Ste. 300, Los Angeles, Calif. 90007

Filed Feb. 12, 1990, Ser. No. 478,542

Int. Cl.[5] B01D *15/00*

U.S. Cl. 210—264 **4 Claims**



1. A water filter comprising:

a housing having an elongated vertically-extending chamber with a lower end having a water outlet, an upper end having an air outlet, and a middle part having a water inlet;

a mass of activated charcoal grains in said chamber lying below said water inlet;

a mass of ion exchange material in said chamber lying on said charcoal grains but generally below said water inlet, said ion exchange material including a multiplicity of resin beads;

an air-passing retainer lying in said chamber above said ion exchange material and above said water inlet, but below said air outlet;

said ion exchange material lying directly on said mass of activated charcoal grains, and said retainer being spaced above said ion exchange material, with the volume of the portion of said chamber lying between said retainer and said mass of ion exchange material being less than the volume of said mass of ion exchange material.

4,978,450

FILTERING ELEMENT

Mordeki Drori, P.O. Box 21538, Tel Aviv, Israel

Division of Ser. No. 13,248, Feb. 10, 1987, Pat. No. 4,935,126. This application Aug. 8, 1988, Ser. No. 229,819

Claims priority, application Israel, Feb. 11, 1986, 77866; Jun. 3, 1986, 79012; Sep. 21, 1986, 80104; Sep. 21, 1986, 80098; Nov. 7, 1986, 80552; Nov. 7, 1986, 80551

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.[5] B01D *29/46*

U.S. Cl. 210—488 **2 Claims**

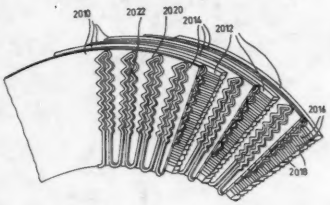
1. For use in a disk-type filter including a housing having an inlet connectable to an upstream pipe, and an outlet connectable to a downstream pipe,

a stack of disks disposed within the housing for separating solid particles from a fluid flowing between the disks from the upstream side of the stack to the downstream side thereof, and a filter aid in operative engagement with said stack and disposed at the upstream side thereof;

wherein the stack comprises a plurality of co-operating filter elements defining a plurality of paired co-operating filter surfaces, including:

a first surface defining a plurality of spaced, generally circumferentially extending raised line portions separated by generally circumferentially extending grooves; and

a second surface defining a plurality of generally radially extending fingers each outlined by a raised line portion, the exterior of the fingers communicating with either one



of the upstream side or the downstream side and the interiors of the fingers communicating with the other one of the upstream side or the downstream side.

4,978,451

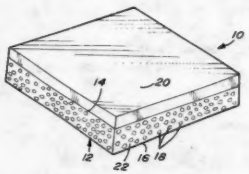
SUPPORTED HYDROPHILIC MEMBRANE

John A. Taylor, Pinckney, Mich., assignor to Separation Dynamics, Inc., Southfield, Mich.

Filed Sep. 5, 1989, Ser. No. 402,229

Int. Cl.[5] B01D *67/00, 69/00*

U.S. Cl. 210—500.27 **13 Claims**



1. A supported membrane for separating water from a water and hydrocarbon and/or halogenated hydrocarbon mixture, said membrane comprising porous support means (**12**) forming a first layer for structurally supporting said membrane thereon, said porous support means (**12**) including two sides (**14,16**) and a plurality of pores (**18**) extending therethrough providing fluid communication between said two sides (**14,16**); and characterized by a nonporous water and water soluble substance permeating membrane (**20**) supported by said porous support means over each of said pores (**18**) for selectively permeating only water and water soluble substances through each of said pores (**18**) from the mixture and enabling a thinner layer of said nonporous membrane over each of said pores and supported sufficient to withstand increased pressures resulting in improved efficiencies of water flow across said membrane.

6. A method comprising making a supported membrane (**10**) having properties for separating water from water and hydrocarbon and/or halogenated hydrocarbon mixtures by forming a porous support material (**12**) into a first layer, the first layer including two sides (**14,16**) and a plurality of pores (**18**) extending therethrough providing fluid communication between the two sides (**14,16**) and adhering a nonporous water and water soluble substance permeating membrane (**20**) to said porous support material enabling a thinner layer of said nonporous membrane to withstand increased pressures resulting in improved efficiencies of water flow across said membrane.

4,978,452

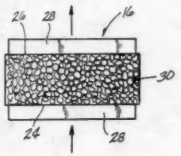
METHOD FOR PRODUCING WAX IMPREGNATED FILTERS FOR INVESTMENT CASTING APPLICATIONS

Leonard S. Aubrey, Arden, N.C., assignor to Alusuisse-Lonza Services Ltd., Zurich, Switzerland

Filed May 15, 1989, Ser. No. 351,589

Int. Cl.[5] B01D *39/20*

U.S. Cl. 210—510.1 **11 Claims**



7. A filter blank/wax composite for use in an investment casting apparatus having a ceramic shell which comprises:

a porous ceramic substrate impregnated with wax;

said substrate having an entrance face through which molten metal can enter the substrate, an exit face through which said molten metal in a filtered state can exit said substrate, and integral peripheral edges;

said entrance and exit faces each having a layer of wax bonded thereto; and

said integral peripheral edges being substantially wax-free and having exposed ceramic surfaces which can be bonded directly to said ceramic shell.

4,978,453

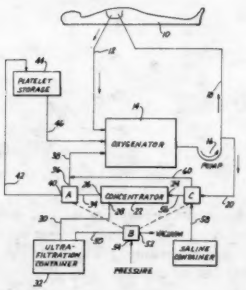
PLATELET COLLECTION PROCESS

Ronald J. Leonard, Ann Arbor, Mich., assignor to Baxter International, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 926,865, Nov. 4, 1986, Pat. No. 4,800,022, which is a continuation of Ser. No. 711,145, Mar. 13, 1985, abandoned. This application Oct. 31, 1988, Ser. No. 264,660

Int. Cl.[5] B01D *65/02*

U.S. Cl. 210—636 **6 Claims**



1. A method of collecting platelets from whole blood comprising:

transporting said whole blood through a passageway defined by at least a first porous membrane;

selectively applying a pressure differential across said porous membrane to supply a vacuum drawing substantially only plasma through said porous membrane and concentrate platelets along said passageway walls;

terminating the passage of said blood through said passageway;

passing an aqueous solution through said passageway to

substantially remove any blood components in said passageway while maintaining said pressure differential across said membrane;

removing said pressure differential across said porous membrane while said aqueous solution is being passed through said passageway.

4,978,454

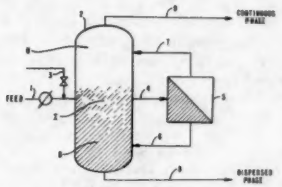
MEMBRANE ASSISTED SETTLING PROCESS

James R. Sweet, Clearwater, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Nov. 13, 1989, Ser. No. 434,735

Int. Cl.[5] B01D *61/58*

U.S. Cl. 210—640 **12 Claims**



1. A method for separating a mixture of two dispersed phases into separate streams the method comprising feeding the mixture into a settling zone wherein the mixture separates into a lower phase, an upper phase and an intermediate mixed phase having components of both the lower phase and upper phase present therein, withdrawing a stream from the settling zone of this intermediate mixed phase and feeding said intermediate mixed phase stream to a membrane separation unit to produce a retentate rich in one phase and a permeate rich in the other phase, withdrawing the retentate from the membrane unit and feeding it back to the settling zone at a feed back location above or below the point at which the stream of intermediate mixed phase fed to the membrane unit was initially withdrawn, said feed back location being that at which the composition of the retentate matches the phase composition present in the settling zone, withdrawing the permeate from the membrane unit and feeding it back to the settling zone at a feed back location below or above the point at which the stream of intermediate mixed phase fed to the membrane unit was initially withdrawn, said feed back location being that at which the composition of the permeate matches the phase composition present in the settling zone, withdrawing a bottoms fraction rich in one phase from the settler zone and withdrawing a tops fraction stream rich in the other phase from the settler zone and sending these separate bottoms fraction and tops fraction to further processing or recycle as appropriate.

4,978,455

P-XYLYLENEDIAMIDE/DIIMIDE COMPOSITE RO MEMBRANES

Scott B. McCray, Bend, Oreg., assignor to Bend Research, Inc., Bend, Oreg.

Continuation-in-part of Ser. No. 98,201, Sep. 15, 1987, Pat. No. 4,853,122. This application Mar. 6, 1989, Ser. No. 320,291

The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.

Int. Cl.[5] B01D *69/00*

U.S. Cl. 210—654 **7 Claims**

1. A composite membrane comprising:

(a) a microporous polymeric support; and

(b) an aromatic aliphatic diamide/diimide membrane formed on said support by interfacial polymerization of

(i) a mixture of trimesoyl chloride and isophthaloyl chloride containing ≧20 wt % trimesoyl chloride, and

(ii) an aromatic aliphatic amine/imine of the formula

$$R_2HNR_1—Ph—R_1NHR_2$$

where Ph is a para-substituted phenylene group, R_1 is an alkylene group containing from 1 to 2 carbon atoms, and R_2 is hydrogen or an alkyl group containing from 1 to 2 carbon atoms.

4,978,456

METHOD FOR INHIBITING SCALE AND CORROSION IN WATER SYSTEMS

Sherman J. Sprague, Twinsburg, Ohio, assignor to The Mogul Corporation, Chagrin Falls, Ohio

Continuation-in-part of Ser. No. 205,117, Jun. 10, 1988. This application Jul. 24, 1989, Ser. No. 383,725

Int. Cl.[5] C02F *5/14*

U.S. Cl. 210—699 **4 Claims**

1. A method of treating aqueous systems to inhibit calcium, magnesium and silica mineral deposits comprising adding to the water in the system less than a stoichiometric amount of an inhibiting composition comprising a mixture of about

(a) 0.5 to 1.5 parts by weight of at least one acrylic polymer having an average molecular weight of from about 100 to about 5,000;

(b) 0.5 to 1.5 parts by weight of at least one water-soluble polymer derived from maleic acid or its anhydride having an average molecular weight of from about 500 to about 1,000;

(c) 0.5 to 1.5 parts by weight of at least one water-soluble organic phosphonate which is a salt of 1, hydroxyethylidene-1,1-di-phosphonic acid; and

(d) 0.1 to 0.5 parts by weight of at least one water-soluble organic chelant which is a salt of ethylenediamine tetracetic acid,

the ratios of said acrylic polymer, maleic acid or its anhydride polymer, and water-soluble organic phosphonate to said chelant being 1:1:1 to 0.3.

4,978,457

METHOD OF FILTERING A BRINE

Darrell L. Gallup, Chino, and John L. Featherstone, El Centro, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Feb. 26, 1990, Ser. No. 485,123

Int. Cl.[5] B01D *29/66*

U.S. Cl. 210—747 **25 Claims**

1. A method of extending the life of a media filter used for filtering a brine comprising, contacting a condensate of steam derived from the brine with an oxidant to oxidize a substantial portion of an oxidizable sulfur species contained therein, adjusting the pH of the condensate to be within about 1.0 pH units of the pH of the filtered brine, and using the treated condensate as a wash water for the filter.

4,978,458

METHOD OF PURIFYING WATER FOR DRINK WITH SOLAR LIGHT AND HEAT AND APPARATUS USED FOR THE SAME METHOD

Jitsuo Inagaki, 71, Aza Kamiyashiki, Oaza Itsusiki, Itsusikicho, Hazugun, Aichi, and Hisako Sawata, 562, Namiki 3-chome, Tsukuba-shi, Ibaragi, both of Japan

Filed May 3, 1989, Ser. No. 346,646

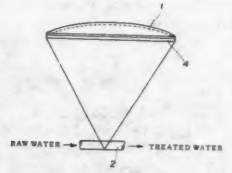
Claims priority, application Japan, Feb. 23, 1989, 1-41847

Int. Cl.[5] C02F *1/30*

U.S. Cl. 210—748 **8 Claims**

1. A method of purifying raw water for drinking purposes comprising the steps of condensing solar light with a refractor having a focal point to obtain a high density light beam and passing the raw water through a heat resistant glass tube having a transparent section located at the focal point of the refractor, and a mirrored or white scattering surface facing a

light incident axis, while passing the light beam through the transparent section of the glass tube and reflecting it off the



mirrored or white scattering surface so as to expose the raw water to said high density light beam for sterilization of the raw water.

4,978,459

OIL SPILL MICROEMULSION DISPERSANTS

Jan Bock, Bridgewater; Gerard P. Canevari, Cranford, and Max L. Robbins, South Orange, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 177,406, Apr. 4, 1988, abandoned, which is a continuation-in-part of Ser. No. 50, Jan. 2, 1987, Pat. No. 4,764,285, which is a continuation-in-part of Ser. No. 613,716, May 24, 1984, abandoned. This application Feb. 2, 1989, Ser. No. 305,139

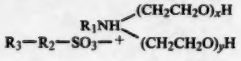
The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.

Int. Cl.[5] E02B *15/04*

U.S. Cl. 210—749 **3 Claims**

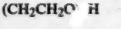
1. A method for dispersing an oil spill on sea water, which method comprises applying to the oil spill surface an effective amount of: (i) a blend of one or more hydrophilic and one or more lipophilic surfactants so balanced that they will form microemulsions with the sea water and the oil to be dispersed; (ii) a solvent which is miscible with the oil to be dispersed and in which the blend of surfactants is substantially soluble; and (iii) from 0 to about 10 weight percent water, wherein the blend of surfactants is such that it lowers the interfacial tension between the oil to be dispersed and the sea water to less than about 250 mdynes/cm when the blend is used at a treat rate of less than about 1 to 100 by weight, based on the oil to be dispersed, wherein the solvent is a hydrocarbon solvent selected from the group consisting of No. 2 diesel fuel oil, kerosene and white oil, wherein the blend of surfactants is comprised of two or more surfactants selected from:

(a) an ethoxylated alkyl or alkanol ammonium salt of n alkyl or alkyl/aryl sulfonate of the formula:

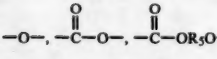


where R_1 and R_3 are alkyl groups containing 8 to 24 carbon atoms and R2 is an aryl or 1 or 2 methyl substituted aryl; and $x+y=2$ to 20.

(b) an ethoxylated nonionic surfactant of the formula:



where R_4 is an alkyl or mono- or di-alkyl aryl group containing 8 to 30 carbon atoms,



R_5 is a poly hydroxyl group derived from glycerol, glycols, sorbitol or various sugars; and n is an integer from 1 to 30.

4,978,460

AQUEOUS SWOLLEN MACROMOLECULE-CONTAINING SYSTEM AS WATER FOR FIREFIGHTING

Hubert Von Blücher, Freytagstrasse 45; Hasso Von Blücher, Columbusstrasse 58, both of D-4000 Düsseldorf, and Ernest De Ruiter, Höhenstrasse 57a, D-5090 Leverkusen 3, all of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 855,196, Apr. 23, 1986. This application May 12, 1988, Ser. No. 193,438

Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3515865; May 15, 1987, 3716304

Int. Cl.[5] A62D *1/00*; C09K *21/14, 21/00*

U.S. Cl. 252—2 **7 Claims**

1. In a flowable mass of water for fire fighting containing particles of a strongly swelling water-insoluble high molecular weight polymer as gelatinizing agent, the improvement which comprises a water-soluble release agent which does not cause the particles of said gelatinizing agent to swell, the particles of the gelatinizing agent being encased or dispersed in the release agent, the release agent being selected from the group consisting of, diammonium biphosphate, a sugar or a sugar derivative.

4,978,461

LOW AND HIGH TEMPERATURE DRILLING FLUIDS BASED ON SULFONATED TERPOLYMER IONOMERS

Dennis G. Peiffer, East Brunswick; Robert D. Lundberg, Bridgewater, both of N.J.; John C. Newlove, Kingwood, and Eugen R. Werlein, Simonton, both of Tex., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 902,772, Sep. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 725,362, Apr. 19, 1985, abandoned. This application Mar. 20, 1989, Ser. No. 325,423

Int. Cl.[5] C09K *7/06*

U.S. Cl. 252—8.511 **14 Claims**

1. An oil-based drilling mud which comprises:

(a) a hydrocarbon liquid substantially immiscible with water;

(b) about 1 to about 10 parts by weight of water per 100 parts by weight of the hydrocarbon liquid;

(c) about 20 to about 50 lb/bbl. of at least one emulsifier;

(d) weighting material necessary to achieve the desired density; and

(e) about 0.25 to about 6.0 lb/bbl. of a neutralized sulfonated thermoplastic terpolymer having an Mn of about 5,000 to about 200,000, said neutralized sulfonated thermoplastic polymer having about 5 to about 100 meq. of metal neutralized sulfonate groups per 100 grams of the neutralized sulfonated thermoplastic terpolymer, wherein said sulfonated thermoplastic terpolymer is a terpolymer of p-methylstyrene/metal neutralized styrene sulfonate/styrene formed by a free radical emulsion polymerization, wherein the terpolymer has 20 to 45 mole percent of p-methyl-styrene.

4,978,462

COMPOSITIONS AND PROCESS FOR THE TREATMENT OF TEXTILES COMPRISING A RESINOUS BRANCHED POLYORGANOSILOXANE AND A POLYDIORGANOSILOXANE IN AN AQUEOUS DISPERSION

Julie H. Sheppard, Leefdaal, Belgium, assignor to Dow Corning Limited, Barry Wales, Wales

Filed Sep. 8, 1989, Ser. No. 404,392

Claims priority, application United Kingdom, Sep. 28, 1988, 8822726

Int. Cl.[5] D06M *100/00*

U.S. Cl. 252—8.6 **12 Claims**

1. An aqueous composition which comprises water having dispersed therein (A) a cationic compound which is substantive to water rinse on textile fibers, and (B) a mixture comprising (i) from 95 to 55 percent by weight of a resinous branched

polyorganosiloxane wherein at least 90 percent of the siloxane units are those represented by the general formula $RSiO_{3/2}$ in which R represents an alkyl group having from 1 to 8 inclusive carbon atoms, any remaining units in the polyorganosiloxane being selected from units having the general formula

$$R_n'SiO_{\frac{4-n}{2}}$$

in which each R' represents an alkyl group having from 1 to 4 carbon atoms or a phenyl group and n has a value of 0, 2 or 3 and $PhSiO_{3/2}$ units in which Ph represents the phenyl group, and (ii) a solvent for the polyorganosiloxane which is from 5 to 45 percent by weight of a low viscosity polydiorganosiloxane having a viscosity in the range from 2 to 1000 mPa.s at 25° C. and in which at least 90 percent of the total organic substituents are methyl, any remaining substituents being selected from monovalent hydrocarbon groups having from 2 to 6 carbon atoms.

4,978,463

LUBRICATING RUBBER COMPOSITION

Fuminori Satoji, Kuwana, Japan, assignor to NTN-Rulon Industries, Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,290
Claims priority, application Japan, Feb. 2, 1988, 63-23424
Int. Cl.[5] C10M *107/40, 107/54*
U.S. Cl. 252—12 **8 Claims**

1. A lubricating rubber composition comprising:
a diene rubber; and
a fluoropolymer having at least one group selected from the group consisting of isocyanate group and cyanate group wherein said fluoropolymer is present in 3–100 parts by weight per 100 parts by weight of diene rubber.

4,978,464

MULTI-FUNCTION ADDITIVE FOR LUBRICATING OILS

Catherine L. Coyle, Mendham, N.J.; Thomas R. Halbert, Baton Rouge, La., and Edward I. Stiefel, Bridgewater, N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Sep. 7, 1989, Ser. No. 404,143
Int. Cl.[5] C10M *139/00*
U.S. Cl. 252—42.7 **16 Claims**

1. A lubricating composition comprising: a major amount of an oil of lubricating viscosity; and, a minor amount of an additive having the formula $Mo_4S_4L_6$ wherein L is an organo group selected from dithiocarbamates, dithiophosphates, dithiophosphinates, thioxanthates, and mixtures thereof and wherein the organo group has a sufficient number of carbon atoms to render the additive soluble in the oil.

4,978,465

SULFURIZED METALWORKING LUBRICANTS DERIVED FROM MODIFIED NATURAL FATS AND OILS AND FORMULATIONS

Robert J. Sturwold, Cincinnati, Ohio, assignor to Cincinnati-Vulcan Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 239,673, Sep. 2, 1988, Pat. No. 4,885,104. This application Nov. 30, 1989, Ser. No. 443,889
The portion of the term of this patent subsequent to Dec. 5, 2006, has been disclaimed.
Int. Cl.[5] C10M *129/78*
U.S. Cl. 252—48.4 **20 Claims**

1. A sulfurized metalworking lubricant composition comprising a mixture of
(a) 1 to 45 parts of a C_{1-4} alkyl ester of a C_{12-18} aliphatic carboxylic acid or mixture of aliphatic carboxylic acids derived from animal or vegetable sources wherein the predominant acids contain from 12 to 18 carbon atoms and
(b) 55 to 99 parts of a modified triglyceride having an acid value of 20 or less and hydroxyl value of 25 or less obtained by reacting a natural fat or oil having an iodine value from 5 to 150, a saponification value from 170 to 265 and which is substantially free of hydroxy or keto functionality, 0.1 to 2 equivalents, per equivalent of the natural fat or oil, of a hindered polyol having from 5 to 15 carbon atoms and 2 to 8 hydroxyl groups, and 0.2 to 2 equivalents, per equivalent of the natural fat or oil, of a dicarboxylic acid having from 2 to 36 carbon atoms or a lower alkyl ester thereof; said mixture sulfurized to a sulfur content of from 2 to 20 percent by weight.

4,978,466

NON-COMBUSTIBLE LUBRICATING FLUID

Vadim A. Sirotenko; Eleonora V. Degtyareva; Yakov M. Grinberg; Efim I. Zaretsky; Vadim L. Yasnogorodsky; Andrei M. Khanin, all of Kharkov; Anatoly D. Kantemir, Kharkovskaya; Vladimir N. Tuz, Kharkov; Lidia P. Serezhkina; Moscow, and Alla I. Gnilitskaya, Kharkov, all of U.S.S.R., assignors to Proizvodstvennoe Obiedinenie Atomnogo Turbostroenia "Kharkov Sky Turbinny Zavod" Imeni S.M. Kirova

PCT No. PCT/SU88/00139, § 371 Date Mar. 19, 1990, § 102(e) Date Mar. 19, 1990, PCT Pub. No. WO90/01057, PCT Pub. Date Feb. 8, 1990
PCT Filed Jul. 25, 1988, Ser. No. 490,623
Int. Cl.[5] C10M *173/02, 149/06*
U.S. Cl. 252—49.3 **1 Claim**

1. A non-combustible lubricating fluid comprising polyacrylamide and water, characterized in that it also comprises triethanolamine and sodium nitrite, the ratio of the components being as follows, in % by mass:

polyacrylamide	0.3–0.6
triethanolamine	0.8–1.5
sodium nitrite	0.1–0.3
water	the balance.

4,978,467

AZEOTROPE-LIKE COMPOSITIONS OF PENTAFLUOROETHANE AND DIFLUOROMETHANE

Ian R. Shankland, Williamsville, and Earl A. E. Lund, West Seneca, both of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Sep. 26, 1989, Ser. No. 412,974
Int. Cl.[5] C11D *7/30, 7/50*
U.S. Cl. 252—69 **12 Claims**

1. Azeotrope-like compositions comprising from about 1.0 to about 50.0 weight percent pentafluoroethane and from about 99.0 weight percent to about 50.0 weight difluoromethane which have a vapor pressure of about 119.0 psia at 32° F.

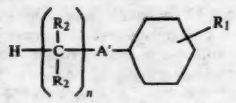
4,978,468

TRACTION FLUID

Narihiko Yoshimura; Hirotaka Tomizawa, and Yasuji Komatsu, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K. K., Tokyo, Japan

Continuation of Ser. No. 98,915, Sep. 21, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 299,308
Int. Cl.[5] C10M *105/34*
U.S. Cl. 252—79 **4 Claims**

1. A traction fluid comprising:
(i) ester or its derivative represented by the formula



wherein A' is an ester linkage of —COO— or —OOC—, n is an integer of from 1 to 14, R_1 is selected from hydrogen and alkyl radicals containing from 1 to 8 carbon atoms, and R_2 is independently selected from hydrogen and alkyl radicals containing from 1 to 3 carbon atoms; and

(ii) from 0.1 to 95% by weight of at least one polymer selected from the group consisting of cyclohexyl acrylate polymer and cyclohexyl methacrylate polymer.

4,978,469

CLEANING COMPOSITION SUITABLE FOR THE CLEANING OF SUB-FREEZING SURFACES

Charles E. Seaman, Jr., Somerset, Wis., assignor to Ecolab Inc., St. Paul, Minn.

Continuation of Ser. No. 50,623, May 15, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,878

Int. Cl.[5] C11D *7/50*

U.S. Cl. 252—170 **7 Claims**

1. A method of cleaning sub-freezing surfaces, which comprises the steps of:

(a) applying to the surface a cleansing amount of a cleaning composition, wherein the cleansing composition does not freeze after application to the surface, wherein the cleansing composition comprises:

(i) about 20–70 wt-% water;

(ii) about 0.5–20 wt-% nonionic surfactant;

(iii) about 0.5–15 wt-% alkaline compound;

(iv) about 10–60 wt-% ethylene glycol, propylene glycol or mixtures thereof;

(v) about 0.5–20 wt-% ethanol, propanol, isopropanol or mixtures thereof;

(vi) about 0–10 wt-% hardness sequestrant;

(vii) about 0–1 wt-% silicone based defoamer; and

(viii) about 0–1 wt-% dye; and then

(b) removing the cleaning composition from the surface.

4,978,470

DETERGENT COMPOSITION FOR CLOTHING: CONTAINING CELLULASE ENZYME WITH NON-DEGRADING INDEX OF 500 OR MORE

Akira Suzuki; Susumu Ito, both of Utsunomiya; Kikuhiko Okamoto, Koshigaya; Eiichi Hoshino, Utsunomiya; Michio Yokosuka, Utsunomiya, and Moriyasu Murata, Chiba, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Continuation of Ser. No. 127,418, Dec. 2, 1987, Pat. No. 4,222,516. This application Feb. 9, 1989, Ser. No. 307,951

Claims priority, application Japan, Dec. 8, 1986, 61-292158

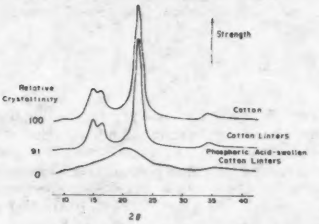
Int. Cl.[5] C11D *3/38, 7/42;* **C12N** *9/42;* **D06L** *1/12*

U.S. Cl. 252—174.12 **1 Claim**

1. A detergent composition for clothing, which comprises a cellulase having a non-degrading index of the following equation of not less than 500

$$\text{non-degrading index} = \frac{\text{hydrolytic rate for low-crystalline cellulose}}{\text{hydrolytic rate for highly crystalline cellulose}}$$

wherein said cellulase is a cellulase which has an optimum pH of not less than 7 or whose relative activity at a pH of not less than 8 is 50% or more of the activity under optimum conditions when carboxymethyl cellulose (CMC) is used as a substrate.



4,978,471

DISPERSIBLE SILICONE WASH AND RINSE CYCLE ANTIFOAM FORMULATIONS

Michael S. Starch, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 228,079, Aug. 4, 1988. This application Aug. 7, 1989, Ser. No. 390,150

Int. Cl.[5] B01D *19/04*

U.S. Cl. 252—174.15 **14 Claims**

1. In a laundry detergent including a surfactant, builder, and at least one foam control agent, the improvement comprising a dispersible silicone antifoam composition for providing controlled foaming comprised of a non-aqueous emulsion of primary and secondary antifoam agents; the primary antifoam agent being a mixture of (a) a polyorganosiloxane, (b) a resinous siloxane or a silicone resin-producing silicon compound, (c) a finely divided filler material, and (d) a catalyst to promote the reaction of mixture components (a), (b), and (c), to form silanolates; the secondary antifoam agent being a blend of a polydimethylsiloxane substituted with polar groups and a polydimethylsiloxane fluid; the substituted polydimethylsiloxane providing more effective reduction of foaming in the laundry rinse cycle; at least one nonionic silicon surfactant, a first organic surfactant dispersing agent, and a second dispersing agent of a nonionic difunctional block-copolymer terminating in primary hydroxyl groups.

4,978,472

PHOSPHOR

Noboru Kotera; Shusaku Eguchi, both of Odawara, and Norio Miura, Isehara, all of Japan, assignors to Kasei Optonix, Ltd., Japan

Continuation of Ser. No. 442,765, Oct. 18, 1982, abandoned, which is a continuation of Ser. No. 159,848, Jun. 16, 1980, abandoned. This application Jun. 21, 1985, Ser. No. 747,437

Claims priority, application Japan, Jun. 17, 1979, 54-77291; Jun. 19, 1979, 54-77290

The portion of the term of this patent subsequent to Apr. 23, 2002, has been disclaimed.

Int. Cl.[5] C09K *11/62*

U.S. Cl. 252—301.4 H **2 Claims**

1. A rare earth element activated stimulable complex halide phosphor represented by the formula:

$$BaF_2.aBaX_2.bMgF_2.dMe^{II}F_2:fLn$$

wherein X is at least one halogen selected from the group consisting of chlorine, bromine and iodine, Me^{II} is at least one divalent metal selected from the group consisting of beryllium, calcium and strontium, Ln is at least one rare earth element selected from the group consisting of divalent europium (Eu^{2+}), cerium (Ce^{3+}) and terbium (Tb^{3+}), and a, b, d and f are numbers satisfying the conditions of $0.90 \leqq a \leqq 1.05$, $0.005 \leqq b \leqq 1.2$, $0 \leqq d \leqq 1.2$ and $10^{-6} \leqq f \leqq 0.03$, and further com-

prising at least one metal fluoride selected from the group consisting of $cMe^{I}F$ wherein Me^{I} is at least one alkali metal selected from the group consisting of lithium and sodium, and c is a number satisfying the condition of $0.01 \leqq c \leqq 0.9$, and $eMe^{III}F_3$, wherein M^{III} is gallium, and e is a number satisfying the condition of $0.0005 \leqq e \leqq 0.03$.

4,978,473

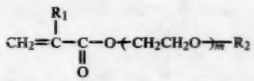
POLYMERIC SOLID ELECTROLYTE

Nobuyuki Kuroda; Hiroshi Kobayashi, both of Yokohama, and Kazuo Matsuura, Tokyo, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,374
Claims priority, application Japan, Jun. 2, 1988, 63-134457
Int. Cl.[5] H01B 1/06
U.S. Cl. 252—500 8 Claims

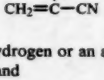
1. A polymeric solid electrolyte which comprises a network molecule formed by polymerizing a polyethylene glycol which has acrylic or methacrylic groups at both ends and an oxyethylene unit of 4–30, wherein the network molecule contains therein

(a) a copolymer, whose mean molecular weight is in the range of 5,000–200,000, formed by copolymerizing a compound represented by the following general formula (I) with a compound represented by at least one of the following general formulas (II) and (III),



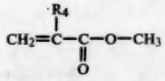
(I)

wherein R_1 is hydrogen or an alkyl group with a carbon number of 1–5, R_2 is an alkyl group with a carbon number of 1–5, and m is an integer of $2 \leqq m \leqq 30$,



(II)

wherein R_3 is hydrogen or an alkyl group with a carbon number of 1–3, and



(III)

wherein R_4 is hydrogen or an alkyl group with a carbon number of 1–3,

(b) a low molecular polyethylene glycol with both ends methyl-etherified, and

(c) an alkali metal salt or ammonium salt;

the ratio by weight of the copolymer (a) to the low molecular polyethylene glycol (b) is in the range of 1:0.1–1:10, the amount of the polyethylene glycol with acrylic or methacrylic groups at both ends is in the range of 10–200 parts by weight based on 100 parts by weight of the total of the copolymer (a) and the low molecular polyethylene glycol (b), and

the amount of the alkali metal salt or ammonium salt (c) is in the range of 1–30 parts by weight based on 100 parts by weight of the total of the copolymer (a), the low molecular polyethylene glycol (b) and the polyethylene glycol with acrylic or methacrylic groups at both ends.

4,978,474

SEALANT

Thomas K. Johnston, Brentwood, Mo., assignor to United Technologies Automotive Inc., Dearborn, Mich.

Filed Jul. 24, 1987, Ser. No. 77,277
Int. Cl.[5] H01B 1/22
U.S. Cl. 252—500 5 Claims

1. A heat pumpable expandable weld through sealant consisting essentially of:

a diblock copolymer of styrene butadiene rubber;

a terpolymer of butadiene-styrene divinyl benzene; and effective amounts of:

c. electrically conductive particles;

a fire retardant;

a blowing agent; and

f. a curing agent to cure the styrene butadiene copolymer and terpolymer wherein the terpolymer is present from about 5% to about 50% by weight of the total copolymer and terpolymer combined.

4,978,475

STABLE LIQUID DETERGENTS CONTAINING ANIONIC SURFACTANT AND MONOSULFONATED BRIGHTENER

Linda A. Halas, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 163,168, Feb. 26, 1988. This application Sep. 5, 1989, Ser. No. 403,203
Int. Cl.[5] C11D 10/02, 7/54
U.S. Cl. 252—549 6 Claims

1. A method for reducing or eliminating brightener staining of fabrics during pretreatment comprising pretreating said fabrics with a stable isotropic liquid laundry detergent composition, comprising, by weight:

(a) from about 7% to about 50% of an anionic synthetic surfactant; and

(b) from abut 0.01% to about 1% of a monosulfonated brightener which represents at least about 60% of the total brightener in the composition; said composition containing less than about 2% of quaternary ammonium cationic surfactants having 2 chains, each containing an average of from about 16 to about 22 carbon atoms.

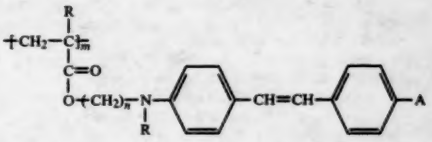
4,978,476

SIDE CHAIN POLYMERS EXHIBITING NONLINEAR OPTICAL RESPONSE

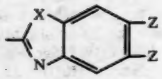
Diane E. Allen, Springfield, and Ronald N. DeMartino, Wayne, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Apr. 2, 1990, Ser. No. 504,193
Int. Cl.[5] F21V 9/04; C09K 19/52; C07D 277/60, 327/10
U.S. Cl. 252—299.01 21 Claims

1. An amorphous polymer which is characterized by recurring monomeric units corresponding to the formula:



where R is hydrogen or a C_1–C_4 alkyl substituent; m is an integer of 5; n is an integer between about 1–20; and A is



where X is —S—, —O— or —NR—; and Z is, independently, —H, —CN, —NO_2 or —CF_3.

4,978,477

PROCESS FOR TREATMENT OF HAZARDOUS WASTES BY REVERSE BURN GASIFICATION

David W. Larsen, St. Louis, and Stanley E. Manahan, Columbia, both of Mo., assignors to Chem Char Research, Inc., Columbia, Mo.

Filed Mar. 30, 1990, Ser. No. 502,327
Int. Cl.[5] G21F *9/00*
U.S. Cl. 252—626 34 Claims

1. A process for the treatment of a hazardous material containing a thermochemically destructible component comprising:

(a) contacting the material with a carbon char,

(b) thereafter loading the carbon char into a reaction vessel having two ends,

(c) initiating a flame front at one end of the loaded vessel,

(d) introducing an oxidant to the other end of the vessel, and

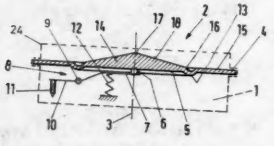
(e) allowing the flame front to move through the carbon char in the direction of the end through which the oxidant is introduced and away from the end at which the flame front was initiated.

4,978,478

CONTROL MEMBRANE FOR A CARBURETOR

Werner Vonderau, Sechselberg, and Ralf R. Grabow, Waiblingen, both of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Aug. 11, 1989, Ser. No. 392,406
Claims priority, application Fed. Rep. of Germany, Aug. 13, 1988, 3827555
Int. Cl.[5] F02M *17/04*
U.S. Cl. 261—35 15 Claims



1. A carburetor for an internal combustion engine, the carburetor comprising:

a housing defining a carburetor chamber wherein fuel is present and a cover mounted on the chamber;

said housing and said cover conjointly defining an annular peripheral holding interface disposed in surrounding relationship to said chamber;

a movable control membrane mounted at said interface so as to be in seal-tight contact engagement with said housing and so as to define a wall of said chamber having a wall surface facing into said chamber;

said control membrane being made of plastic material and said wall surface thereof being an unobstructed and uncovered surface of said plastic material;

said control membrane and said control chamber conjointly defining a common symmetry axis;

metering means for metering fuel to the engine;

transmitting means disposed in said carburetor chamber for coacting with said control membrane to transmit the movement thereof to said metering means so as to cause said metering means to meter fuel to the engine;

said transmitting means having a contact part disposed so as to be symmetrical with respect to said axis and to lie in direct contact engagement with said unobstructed and uncovered surface of said plastic material;

said control membrane including:

an annular wave-like projection formed in said membrane for optimizing the stiffness of said membrane;

said annular wave-like projection defining a central portion of said membrane extending directly from said projection to said axis and an outer annular portion extending from said wave-like projection to include said interface;

said central portion being thickened so as to define a reinforced portion of said membrane for transmitting said movement to said transmitting means via said contact part;

said reinforced portion having a thickness greater than said outer annular portion; and,

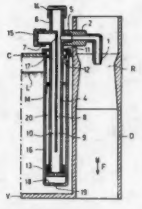
said membrane including said reinforcement portion, said projection and said outer annular portion all being a single component.

4,978,479

CORRECTED JET FOR AN ENGINE CARBURETOR

Marco Morini, Via Ponte Romano 108, I-11027 Saint Vincent, Italy

Filed Sep. 13, 1989, Ser. No. 406,571
Claims priority, application Italy, Sep. 30, 1988, 67876 A/88
Int. Cl.[5] F02M *7/23*
U.S. Cl. 261—121.3 6 Claims



1. A jet for the carburetor of a gasoline internal combustion engine, said carburetor including a fuel bowl wherein a constant level of gasoline is maintained and a choke having a restricted cross section, wherein flows the air sucked by the engine,

wherein the jet comprises a delivery spout located within the restricted cross section of the choke, a first vertical tube which plunges in the constant level fuel bowl, said first vertical tube having a fuel nozzle, said delivery spout communicating with said first vertical tube, a second vertical tube which plunges into the constant level fuel bowl and surrounds said first vertical tube, said second vertical tube having at the lower end thereof a bottom and a calibrated hole traversing said bottom, and having near its top end through apertures located at a level higher than the constant level of gasoline in the fuel there being a gap between said first and second vertical tubes, said first vertical tube having a secondary air intake, a secondary air nozzle, an internal dividing wall, a first section and a second section delimited by said dividing wall, said first section communicating with said delivery spout and said second section communicating with said secondary air intake.

4,978,480

METHOD OF MAKING NUCLEAR FUEL COMPACTS

Orlin M. Stansfield, San Diego, and Robert W. Schleicher, Jr., Carlsbad, both of Calif., assignors to General Atomics, San Diego, Calif.

Filed Dec. 29, 1988, Ser. No. 291,549
Int. Cl.[5] G21C 21/00
U.S. Cl. 264—0.5 19 Claims

1. A method of forming nuclear fuel compacts that incorporate a metallic matrix material, which method comprises the steps of

forming spheroidal nuclear fuel particles including fissile or fertile nuclear fuel material within surrounding fission-product-retentive means,

overcoating said nuclear fuel particles with a thin layer of an elemental substance that is wet by the matrix material,

combining said overcoated particles and said matrix material, and

subjecting said combination to heat and high pressure to form a fuel compact whereby the wetting of said overcoating by said matrix material equilibrates said pressure about the outer surfaces of said particles and substantially reduces fracturing of said fission-product-retentive means of said particles.

4,978,481

PROCESS FOR THE ENCAPSULATION OF PREFORMED SUBSTRATES BY GRAFT COPOLYMERIZATION

Robert A. Janssen, Alpharetta; Earl C. McCraw, Jr., Duluth, and Paul C. Nicholson, Dunwoody, all of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 13, 1989, Ser. No. 297,019
Int. Cl.[5] B29D 11/00
U.S. Cl. 264—1.4 19 Claims

1. A process for encapsulating a preformed polymer substrate by treating said substrate with ozone to form peroxy and hydroperoxy groups thereon and graft copolymerizing said peroxidized and hydroperoxidized substrate with a ethylenically unsaturated monomer or monomer mixture which must contain at least one crosslinking monomer to encapsulate the preformed polymer substrate with a coating of crosslinked polymer derived from said monomer or monomer mixture, wherein the improvement consists essentially of

saturating or swelling the substrate with a liquid before or after the ozonation step, said liquid being insoluble in the ethylenically unsaturated monomer or monomer mixture.

4,978,482

MELT CAST THERMOPLASTIC ELASTOMERIC PLASTIC BONDED EXPLOSIVE

Nancy C. Johnson, Waldorf; Robert C. Gill, White Plains; John F. Leahy, Bowie; Carl Gotzmer, Jr., Accokeek; Harold T. Fillman, Bowie, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 29, 1984, Ser. No. 665,906
Int. Cl.[5] C06B 45/10
U.S. Cl. 264—3.1 19 Claims

1. A method of melt casting plastic bonded explosives comprising:

A. forming a uniform binder mixture by mixing the following ingredients under low-shear conditions at a temperature of from 80° C. to 110° C.:

(1) from 18 to 22 weight percent of a triblock polymer of the formula A-B-A wherein A represents a polystyrene block and B represents an elastomeric midblock which is selected from the group consisting of polybutadiene, polyisoprene, and polyethylenebutylene, and

(2) from 78 to 82 weight percent of a low viscosity oil selected from the group consisting of naphthenic, paraffinic, and olefinic oils,

provided that the sum of the weight percents of the triblock polymer and the oil equals 100 weight percent and provided that the viscosity of the binder mixture is less than 300 poise at 100° C;

B. mixing an energetic filler into the binder mixture under low shear conditions and at a temperature of from 80° C. to 110° C., provided that the viscosity of the mixture does not exceed 20 kilopoise.

C. pouring the energetic filler-binder mixture formed in step B into a mold; and

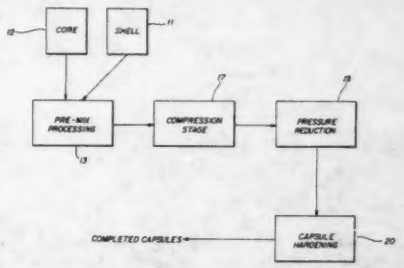
D. cooling energetic filler-binder mixture to form a solid explosive composite.

4,978,483

APPARATUS AND METHOD FOR MAKING MICROCAPSULES

Bruce K. Redding, Jr., P.O. Box 66, Darby, Pa. 19023

Continuation-in-part of Ser. No. 101,802, Sep. 28, 1987, abandoned. This application Apr. 29, 1988, Ser. No. 187,982
Int. Cl.[5] B01J 13/02, 13/20, 13/22
U.S. Cl. 264—4.32 39 Claims



1. A method of making capsules, comprising the following steps:

a. forming a dispersion of a core material and a shell material; and

b. applying a pressure shock wave to the dispersion, the pressure shock wave being applied in a sufficient amount and for a sufficient time to cause capsules to form.

32. An apparatus for making capsules comprising:

a. a means for forming a dispersion of a core material and a shell material; and

b. means for applying a pressure shock wave to said dispersion, said means applying a shock wave in a sufficient amount and for a sufficient time to cause capsules to form.

4,978,484

METHOD OF AND APPARATUS FOR MANUFACTURING BIAXIALLY ORIENTED FILM

Masao Takashige; Teruyuki Iwai; Hidenobu Takeichi; Yasuo Takai; Yoshinori Sasaki; Masato Masuoka, and Yuichi Ohki, all of Himeji, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

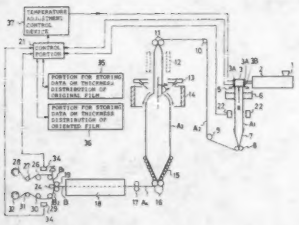
Filed Mar. 30, 1989, Ser. No. 331,624
Claims priority, application Japan, Mar. 31, 1988, 63-79286; Mar. 31, 1988, 63-79287; May 30, 1988, 63-132365; Nov. 24, 1988, 63-296575
Int. Cl.[5] B29C 47/92, 55/28
U.S. Cl. 264—40.1 20 Claims

1. In a method of manufacturing a biaxially oriented film, including the steps of rapidly cooling molten thermoplastic resin, which has been extruded from an annular extruding die, to form a tubular original film, biaxially orienting said tubular original film by heat supplied from a heating means while conveying said tubular original film between two sets of nip rolls, each nip roll having an individual circumferential speed, and forming said tubular original film, during said conveyance thereof between said nip rolls, into a shape of a bubble by

injecting pressurized gas into said tubular original film, the improvement comprising the steps of:

detecting a thickness distribution of at least one of said original film and said biaxially oriented film; detecting a temperature distribution around at least one of said annular extruding die and said heating means, which temperature distribution corresponds to said thickness distribution; changing said temperature distribution based on a relationship between said thickness distribution and said temperature distribution, whereby said thickness distribution of said at least one of said original film and said biaxially oriented film is made uniform.

5. In an apparatus for manufacturing a biaxially oriented film, including an annular extruding die and means for obtaining a tubular original film by extruding molten thermoplastic resin from said annular extruding die and thereafter rapidly cooling said resin, means for producing a biaxially oriented film from said tubular original film, including means for applying heat to and injecting pressurized gas into said tubular



original film, and two sets of nip rolls for conveying said tubular original film therebetween and between which said heat is applied, the improvement comprising:

means for enabling a temperature distribution around at least one of said extruding die and said biaxially oriented film to be division-controlled;

means for detecting a thickness distribution of at least one of said original film and said biaxially oriented film, which thickness distribution corresponds to said temperature distribution;

temperature distribution detecting means for detecting a value of said temperature distribution around said at least one of said extruding die and said biaxially oriented film; and

control means for division-controlling said temperature distribution around said at least one of said extruding die and said biaxially oriented film based on a relationship between said detected thickness distribution and said corresponding detected temperature distribution value.

4,978,485

METHOD FOR CONTROLLING A QUENCH FLUID VELOCITY IN A POLYMER MELT SPINNING PROCESS

Paul R. Daugherty, Seabrook, Tex.; Jerry R. McNair, and Patrick F. O'Donnell, both of Stone Mountain, Ga., assignors to Amoco Corporation, Chicago, Ill.

Filed Jul. 25, 1988, Ser. No. 223,909

Int. Cl.[5] D01D *5/088*

U.S. Cl. 264—40.2 **6 Claims**

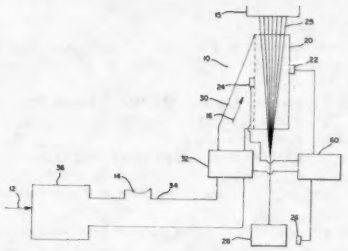
1. A method for controlling a quench fluid velocity in a polymer melt spinning process comprising:

(a) melt spinning a plurality of polymer filaments through a spinneret into a quench fluid zone;

(b) introducing a quench fluid stream from a quench fluid delivery system into the quench fluid zone to cool the polymer filaments;

(c) measuring a velocity of the quench fluid stream with an anemometer;

(d) controlling a damper valve drive mechanism which includes an alternating current bi-rotational reduction motor having a worm gear fixed to the motor and in mesh with a worm wheel fixed to a damper valve shaft with the rotating axis of the worm wheel at a right angle to that of the worm gear and aligned with the damper valve shaft in



the quench fluid delivery system based on the measured quench fluid stream velocity to obtain a desired velocity of the quench fluid stream; and

(e) winding the polymer filaments onto a polymer filament receiving means.

4,978,486

METHOD FOR PREPARING PERFORATED FILM

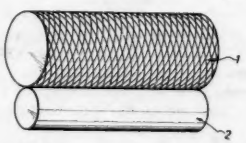
Michiyasu Ito, Kuwana; Toshiyuki Ishii, Kasugai; Shuji Matumura, Nagoya; Hajime Mushika, Niwa, and Tomohide Tanaka, Nagoya, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Aug. 19, 1988, Ser. No. 234,106

Claims priority, application Japan, Aug. 20, 1987, 62-204993; Aug. 20, 1987, 62-204994

Int. Cl.[5] B29C *67/20, 59/04*

U.S. Cl. 264—41 **17 Claims**



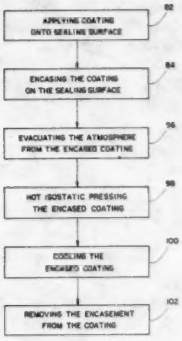
1. A method for preparing a perforated film from an at least uniaxially oriented filled polyolefin film containing 20–400 parts by weight of a filler per 100 parts by weight of a polyolefin and oriented at a stretching ratio of not less than 4, which comprises thermally embossing the oriented polyolefin film by passing the film, while heated between its softening temperature and its melting point and while constrained from shrinking, between an embossing roll having a large number of protruded knobs and a pinch roll which presses the film against the knobs so as to cause the free end of the knobs to penetrate the film and form pores therein, while simultaneously taking up the resultant film at a rate not less than the processing speed of the embossing roll, thereby increasing the dimensions of the pores.

4,978,487

METHOD OF TREATING A COATING ON A REACTOR COOLANT PUMP SEALING SURFACE

Elmer E. Eiffler, Glenshaw; Natraj C. Iyer, Monroeville; Alan T. Male, Murrysville, and David J. Boes, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 13, 1989, Ser. No. 296,654
Int. Cl.[5] B05D 3/12
U.S. Cl. 264—60 10 Claims



1. A method of treating a coating on a sealing surface of a sealing assembly component, said treating method comprising the steps of:

(a) applying a material onto a groove formed on the sealing surface of the sealing assembly component to form a coating thereon;

(b) encasing at least the coating on the sealing surface by applying a metallic cover thereover, said encasing being carried out by welding the cover to the surface of the sealing assembly component so as to seal the cover thereon from the external atmosphere;

(c) evacuating the atmosphere between the cover and coating on the sealing surface; and

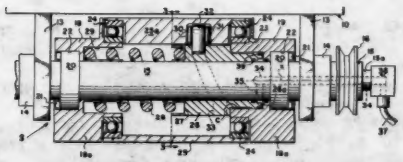
(d) hot isostatic pressing the sealing assembly component and the coating thereon encased by the cover in order to density the coating to substantially its full theoretical density and metallurgically bond the coating to the surface of the sealing assembly component at the groove thereon.

4,978,488

CONCRETE BLOCK MOLDING MACHINE HAVING CONTINUOUSLY DRIVEN VIBRATING SHAFT MECHANISM WHICH CAN BE PROGRAMMABLY VIBRATED AND METHOD OF PROGRAMMABLY VIBRATING SUCH MACHINES

Mark P. Wallace, Alpena, Mich., assignor to Besser Company, Alpena, Mich.

Continuation of Ser. No. 255,877, Aug. 1, 1988, abandoned. This application Feb. 12, 1990, Ser. No. 479,235
Int. Cl.[5] B28B 1/08, 3/06; B65G 27/20
U.S. Cl. 264—72 15 Claims



7. A method of molding concrete blocks by programmably vibrating a concrete block molding machine having a vibratible frame with a mold box incorporating at least one molding cavity for a concrete mixture which is to be densified in said cavity; at least one vibration-causing shaft assembly supported on said frame to impart vibrating motion thereto; bearings on said frame for journaling the ends of said shaft assembly; a drive connected with said shaft assembly for driving said shaft assembly in continuous rotation; said shaft assembly mounting a first portion eccentric to the axis of said shaft assembly and a circumferentially movable balancing mass mounted for relative rotation with said first eccentric portion on said shaft assembly between circumferential positions in a first of which said mass substantially balances the centrifigal force imparted eccentrically by said first eccentric portion to produce a null level of vibration and a second position in which densifying vibration is produced, said mass in said first position being substantially 180° opposite said first eccentric portion; said shaft assembly having a cylinder with a piston thereon, one of which is axially movable relative to the other; means interconnecting said axially movable one of said cylinder and piston with said mass to produce rotary motion of said mass in one circumferential direction relative to said first eccentric portion to move said mass from a balancing position relative to said first eccentric portion toward a radially offset position; spring means of predetermined rate opposing axial movement of said movable one of said piston and cylinder and operative to move it in an opposite direction to restore said mass; and fluid pressure supply means for supplying fluid under a predetermined pressure to said cylinder in opposition to said spring means to control the axial position of said movable one of said piston and cylinder and consequentially the circumferential position of said mass relative to said first eccentric portion via said spring means, said method comprising the steps

a. supplying said concrete mixture to said molding cavity for densification during a predetermined time period of a cycle;

b. continuously driving said shaft assembly at a predetermined speed;

c. cyclically over said predetermined time period successively introducing fluid under a predetermined variable pressure to said cylinder and piston in opposition to the force exerted by said spring means to relatively move said mass and said first eccentric portion from substantially a position of 180° circumferential opposition in which the vibration produced is substantially null to a substantial vibration producing position out of substantial centrifugal balance to produce densifying vibration having an intensity during a predetermined first portion of said time period in which said mold cavity is supplied with said concrete mixture to be molded;

d. thereafter introducing additional fluid under pressure to said cylinder and piston in opposition to said force exerted by said spring to relatively move said mass and said first eccentric portion to a position further removed from said position of 180° circumferential opposition in which said densifying vibration produced is of greater intensity during a second portion of said time period than during said first portion of said time period, and in which said second portion of said time period a final densifying of said concrete mixture supplied to said mold cavity occurs to produce a molded product; and;

e. then removing said fluid introduced to said cylinder and piston to restore said mass to a position of 180° circumferential opposition such that said vibration produced is substantially null and stripping said molded product from said mold box during a third portion of said predetermined time period of said cycle.

4,978,489

PROCESS FOR THE MANUFACTURE OF A PERMEABLE SHEET-LIKE FIBROUS STRUCTURE

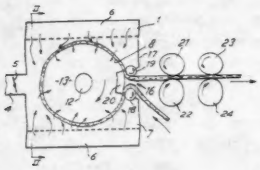
Bronislaw Radvan, Flackwell Heath; Anthony J. Willis, Marlow, and Peter L. Wallace, Flackwell Heath, all of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Continuation of Ser. No. 78,113, Jul. 27, 1987, abandoned. This application May 31, 1989, Ser. No. 361,790

Claims priority, application United Kingdom, Jul. 31, 1986, 8618729

Int. Cl.[5] B32B *5/16*; B29C *43/02*

U.S. Cl. 264—118 23 Claims



1. A process for the manufacture of a stiff permeable sheet-like fibrous structure suitable for through air heating and molding which includes forming a web with 20% to 60% single fibers having a high modulus of elasticity and between 7 and 50 millimeters long, and 40% to 60% by weight of a wholly or substantially unconsolidated particulate plastics material, and then treating the web by heating to melt the plastics material and passing it between a pair of nip rollers so that the plastics material can flow and wet out the fibers, the nip between the rollers being set to a dimension less than the thickness of the unconsolidated web and grater than that of the web if it were to be fully consolidated, and allowing the web to expand and remain substantially permeable after passing through the rollers.

4,978,490

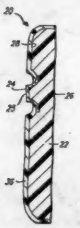
FULL OVERLAYING INJECTION MOLDING

Norman C. Jackson, Livonia, Mich., assignor to The Standard Products Company, Cleveland, Ohio

Filed Sep. 12, 1988, Ser. No. 243,418

Int. Cl.[5] B29C *45/14*, *47/04*

U.S. Cl. 264—148 4 Claims



1. A method of making a trim molding for attachment to a vehicle, said method comprising the steps of:

forming an elongated core member by extruding and cutting a polymeric material to an outer periphery and length less than a predetermined thickness and length;

forming an end at each end of the core member;

molding an outer layer of a polymeric material about at least a portion of one side only of the core member and over said ends to form an outer elongated layer over the core member to the predetermined thickness and to provide a smooth continuous surface from one of said ends to the other of said ends to thereby prevent a transverse joint line from visually appearing in the outer elongated layer between the ends and the core member.

4,978,491

MOLDED RESIN CASING OF ELECTRONIC PART INCORPORATING FLEXIBLE BOARD

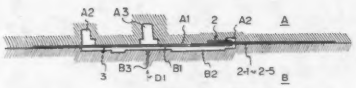
Nobuyuki Yagi; Jiroh Inagaki; Kozo Morita, all of Tokyo; Yasutoshi Kaku, Kanagawa; Nobuyuki Kikuchi, Kanagawa, and Shinji Mizuno, Kanagawa, all of Japan, assignors to Teikoku Tsushin Kogyo Co., Ltd., Kawasaki, Japan

Division of Ser. No. 234,952, Mar. 22, 1988, Pat. No. 4,935,718. This application Sep. 13, 1988, Ser. No. 244,165

Claims priority, application Japan, Aug. 21, 1987, 62-207433; Sep. 22, 1987, 62-238448; Dec. 22, 1987, 62-325679

Int. Cl.[5] B29C *45/14*

U.S. Cl. 264—154 4 Claims



1. A process for manufacturing a molded synthetic resin casing of an electronic part, comprising the steps of:

preparing a first die having a flat surface which is brought into close contact with a surface of a flexible board including a resin film on which a plurality of electrical conductor patterns are formed, a support forming hole in a central portion of said flat surface, and a groove formed around the periphery of said flat surface for forming a side portion of the molded synthetic resin casing, and a second die disposed in opposing relation to said first die and having a casing bottom forming recess formed at a portion thereof corresponding to that portion of said first die which includes said flat surface and at least a part of said groove;

clamping said flexible board between said first die and said second die for causing the surface having said plurality of electrical conductor patterns formed thereon to be brought into abutting contact with the flat surface of said first die and the edge thereof to lie inside the outer edge of said groove; and

filling a cavity between said first and second dies with a molten resin material by injecting said resin material from a central portion of said recess of the second die, said injecting step being carried out at a pressure of the molten resin material whereby said flexible board is punctured and the resin material fills the support forming hole of said first die.

4,978,492

METHOD TO EXTRACT MATERIAL FROM A RUNNING LENGTH OF FIBER

Jim C. Sun, Midlothian; Mark B. Boone, Richmond; James J. Dunbar, Mechanicsville, and Gene C. Weedon, Richmond, all of Va., assignors to Allied-Signal Inc., Morristownship, N.J.

Division of Ser. No. 835,020, Feb. 28, 1986, Pat. No. 4,771,616. This application Aug. 29, 1988, Ser. No. 237,483

Int. Cl.[5] D01F *11/00*

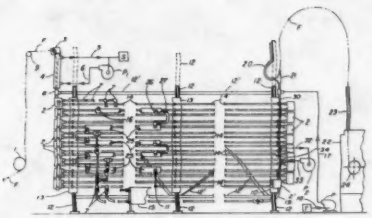
U.S. Cl. 264—180 26 Claims

1. The method of extracting a material from a continuous running length of fiber comprising

a) continuously moving said fiber through a conduit while, simultaneously

b) flowing a solvent for said material through said conduit, said conduit having a length and cross sectional area sufficient to facilitate extraction of the desired amount of said material and said flow in step b) is countercurrent to

said movement of said fiber in step a), so that the concentration of the material being removed from the fiber in the countercurrent flowing solvent changes in a monotonically decreasing manner along the direction of movement of the fiber, the lowest concentration being at the yarn exit and the total length of countercurrent flow in said conduit



being at least about fifty feet in a single unit operation having an infinite number of theoretical stages and said single unit operation having only one entrance and exit for said fiber and only one entrance and exit for said solvent, and said flow of said solvent in said conduit having an average Reynolds number of at least about 500 when determined with no fiber present in said conduit.

4,978,493

PROCESS FOR INJECTION MOULDING MULTILAYERED ARTICLES

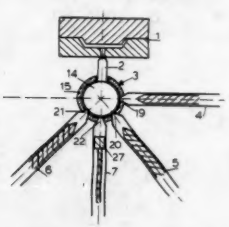
Jozef J. F. M. Kersemakers, Sittard; Henricus E. H. Meijer, Born, and Gerardus Martens, Stein, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Continuation-in-part of Ser. No. 75,976, Jul. 21, 1987, abandoned. This application May 19, 1989, Ser. No. 354,415

Claims priority, application Netherlands, Jul. 21, 1986, 8601883

Int. Cl.[5] B29C *45/02, 45/16*

U.S. Cl. 264—255 **4 Claims**



1. An injection molding process for producing a multilayered article comprising the steps of:

(a) sequentially or coaxially filling a single hollow chamber with a combination of mouldable material from a plurality of plasticising units through a distributor comprising a number of movable disc shaped elements provided with radially extending borings, and

(b) subsequently injecting said combination of mouldable material from said chamber through a boring in said distributor and into a mold.

4,978,494

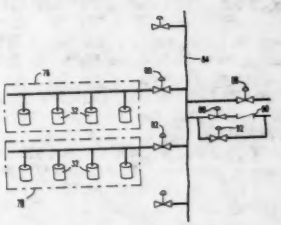
HYDRAULIC LOCK FOR DISPLACER ROD DRIVE MECHANISM (DRDM) AND METHOD OF OPERATION

Eric D. Rinker, Penn Township, Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 1, 1988, Ser. No. 176,575

Int. Cl.[5] G21C *7/06*

U.S. Cl. 376—235 **8 Claims**



8. A drive rod latch in combination with a nuclear reactor having a drive rod disposed in a rod housing characterized in that the drive rod has one end selectively exposed to a first, relatively low pressure zone of the reactor and another end thereof in communication with a second, relatively high pressure zone of the reactor, said drive rod further having disposed on an end thereof a valve member and said rod housing having disposed thereor a corresponding valve seat, and a control valve for selectively establishing communication between the housing and the first zone of the reactor whereby a pressure differential is created across the piston, said pressure differential being sufficient to seat the valve member against the valve seat to thereby establish a pressure boundry.

4,978,495

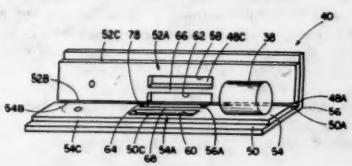
NUCLEAR FUEL PELLET SURFACE DEFECT INSPECTION APPARATUS

Hassan J. Ahmed, Columbia, S.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 199,735, May 27, 1988, Pat. No. 4,894,201. This application Oct. 26, 1989, Ser. No. 426,928

Int. Cl.[5] G21C *19/00*

U.S. Cl. 376—261 **5 Claims**



1. In an apparatus for inspecting nuclear fuel pellets for surface defects and having an inspection chamber, a pellet guide chute assembly extending through the inspection chamber, said guide chute assembly comprising:

(a) a support substrate composed of a pair of elongated wall sections each having a pair of opposite spaced longitudinal edges, said wall sections being rigidly attached together along adjacent ones of said longitudinal edges to form a corner and being angularly displaced from one another at remote ones of said longitudinal edges to have a generally V-shaped configuration in cross section;

(b) a pair of elongated plates respectively disposed on upper adjacent sides of said support substrate wall sections; and

(c) means for adjustably attaching said plates to said wall

sections for sliding movement thereon toward and away from said adjacent longitudinal edges thereof to locate said plates at desired stationary positions thereon for supporting nuclear fuel pellets of different diameters between and on adjacent longitudinal portions of said plates located in the inspection chamber of the apparatus.

4,978,496

ARRANGEMENT TO PREVENT THE MOLTEN CORE OF A NUCLEAR REACTOR FROM PENETRATING INTO THE GROUND

Daniel Dumas, St. Priest, and George Hoynant, Breral, both of France, assignors to Societe Des Electrodes & Refractaires Savoie, Courbevoie, France

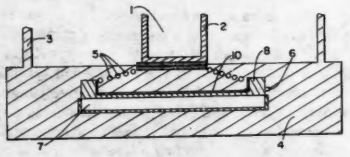
PCT No. PCT/FR88/00293, § 371 Date Feb. 6, 1989, § 102(e) Date Feb. 6, 1989, PCT Pub. No. WO88/09998, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 9, 1988, Ser. No. 327,802

Claims priority, application France, Jun. 11, 1987, 87 08748

Int. Cl.[5] G21C *13/10*

U.S. Cl. 376—280 **8 Claims**



1. A means for preventing the molten corium of a nuclear reactor from penetrating into the ground, comprising:

a concrete raft bearing on the ground and supporting the reactor including a core portion bearing on said raft;

a retaining basin located within said raft, having a greater surface area than the core portion of the reactor bearing on the raft, and having an upper layer oriented toward the reactor comprising a refractory layer of zirconia or thoria at a thickness of about 2 to 10 cm, which is chemically inert toward the corium and a lower layer oriented away from the reactor and formed of a refractory material which is a good conductor of heat, said lower layer having an upper surface oriented toward the upper layer;

a cooling circuit associated with said lower layer and operating by circulation of fluid; and

means for defecting molten corium in vertical travel and causing the molten corium to spread out to the greater surface area of the retaining basin, said means comprising a plurality of horizontally oriented concentric cavities located in the raft between the reactor and the basin, each successive cavity having an outer diameter greater than the outer diameter of the previous cavity and having a center located at a greater vertical distance from the reactor than that of the previous cavity.

4,978,497

APPARATUS FOR THE THERMAL PROTECTION OF THE UPPER SUPPORT FERRULE OF A SUSPENDED VESSEL, PARTICULARLY IN A FAST NEUTRON NUCLEAR REACTOR

Guy Lemercier, Le Puy Sainte Reparade, and Charley Renaux, Jouques, both of France, assignors to Commissariat a l'Energie Atomique, France

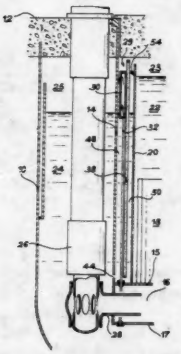
Filed Feb. 8, 1990, Ser. No. 477,296

Claims priority, application France, Feb. 10, 1989, 89 01749

Int. Cl.[5] G21C *15/12*

U.S. Cl. 376—290 **13 Claims**

1. Apparatus for the thermal protection of an upper support ferrule of a suspended vessel, said ferrule being internally duplicated by an internal wall containing a liquid at a first temperature above the creep temperature of the ferrule, said liquid being surmounted by a gas, said apparatus being characterized in that it comprises at least one sealed collecting tank placed between the ferrule and the internal wall and spaced therefrom, at least one pipe connecting said collecting tank to a zone containing liquid, which is normally under pressure, at a second temperature below the first temperature, sprayers



formed in the collecting tank issuing into a gas on a side turned towards the ferrule, and a passive thermal protection structure supported by the collecting tank on the side turned towards the internal wall and spaced from the latter, in such a way that a first annular space is formed between the thermal protection apparatus and the ferrule and that a second annular space is formed between the thermal protection apparatus and the internal wall.

4,978,498

METHOD FOR REMOVING BINDER FROM GREEN BODY

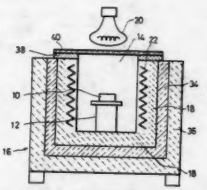
Yoshiro Yoshihiro, Yachiyo; Masahiro Adachi, Atsugi, and Minoru Imai, Sagamihara, all of Japan, assignors to Nippon Welding Rod Company, Ltd., Tokyo, Japan

Filed Feb. 14, 1990, Ser. No. 480,211

Claims priority, application Japan, Dec. 11, 1989, 1-320922

Int. Cl.[5] B22F *7/00*

U.S. Cl. 419—37 **11 Claims**



1. A method for removing a binder from a green body, said binder mainly consisting of a polymer material of ultraviolet degradation properties, comprising the step of:

irradiating said green body with ultraviolet rays at a temperature sufficient to cause said polymer material to carry out photo degradation by ultraviolet rays, resulting in said binder being removed from said green body.

4,978,499

SOFT STEEL FOR MACHINE CUTTING AND METHOD OF PRODUCING IT

Gilles Pierson, Chenieres; Louis Payraudeau, Metz, and Jean Bellot, Pompey, all of France, assignors to Unimetal, Metz Cedex, France

Filed Dec. 1, 1989, Ser. No. 444,259
Claims priority, application France, Jan. 12, 1988, 88 16093
Int. Cl.[5] C22C 38/60
U.S. Cl. 420—87 8 Claims

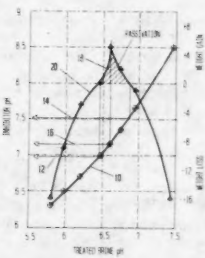
1. A soft steel for machine cutting, wherein said soft steel having composition, in percentages by weight, of C≦0.25%; MN: 0.8 to 1.5%; p≦0.1%; S: 0.15 to 0.40%; Si: 0.05 to 0.40%, wherein said soft steel has been finished such that the inclusions of manganese sulfide are surrounded by a plastic oxide layer of the following average composition, expressed in percentages by weight: SiO_2: 35 to 45%; Al_2O_3: 10 to 20%; CaO: 15 to 25%; MnO: 10 to 20%.

4,978,500

INHIBITOR FOR METAL CORROSION BY BRINE

W. Bruce Murray, 28 Willow Grove, Irvine, Calif. 92714

Filed Sep. 15, 1989, Ser. No. 407,752
Int. Cl.[5] C23F 11/00, 11/06; C23C 22/07, 28/00
U.S. Cl. 422—7 15 Claims



1. A method of inhibiting the corrosion of metal surfaces by brines containing from 0.5 to about 5 weight percent of sodium chloride, which comprises:

a. incorporating in the brine, sodium hexametaphosphate in an amount from 100 to about 500 parts per million, and effective to form a passivating surface on said metal surface;

b. also incorporating in said brine, a soluble orthophosphate in a molar proportion to said hexametaphosphate from 5 to about 10 molar parts per molar part of said hexametaphosphate; and

c. adjusting the pH of said brine to a value from 6.46 to 6.9.

4,978,501

CONTINUOUS PROCESS FOR THE PARTIAL STERILIZATION OF MUSHROOM CASING

Michael F. Diprose, Derbyshire, and Geoffrey H. Evans, Hartford, both of England, assignors to Minister of Agriculture, Fisheries & Food, etc., London, England

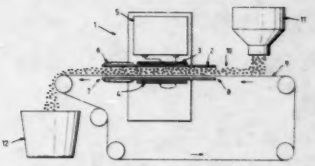
Continuation of Ser. No. 38,070, Apr. 14, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,654
Int. Cl.[5] A61L 2/08; B01J 19/02
U.S. Cl. 422—22 15 Claims

9. A process for at least partially sterilizing wet horticultural material comprising the steps of:

(a) providing an open ended tunnel having radio frequency wave applicator means positioned at least above and below a central portion of the tunnel, said tunnel being defined by steam tight walls constructed of low loss dielectric material in at least a central portion of said tunnel;

(b) continuously passing wet horticultural material through said tunnel; and

(c) exposing at least a part of said wet horticultural material to radio frequency waves in a frequency range of 13 to 100 MHz and at a power density of up to 90 KWm^{-2} for a period of 1–2 minutes to heat said material to a predetermined temperature of 90°–100° C., and thereafter to the heat generated by said waves for a period of time in the range of about 30 seconds to about 20 minutes sufficient to destroy fungi and invertebrate pests, and further wherein



as a result of heating said wet horticultural temperature to said predetermined temperature, steam is generated; the process including the further step of:

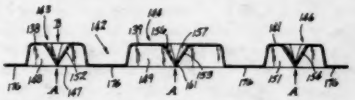
(d) utilizing said steam upstream of said radio frequency wave applicator means to preheat the wet horticultural material, and downstream of said radio frequency wave applicator means to maintain the wet horticultural material at a temperature within about 10° to 15° C. of said predetermined temperature without utilization of additional heating means.

4,978,502

IMMUNOASSAY OR DIAGNOSTIC DEVICE AND METHOD OF MANUFACTURE

Charles M. Dole, Purdys, N.Y.; Gary L. Webster, Fairfield, Conn., and Ward C. Smith, Mahwah, N.J., assignors to Dole Associates, Inc., Katonah, N.Y.

Continuation-in-part of Ser. No. 439, Jun. 5, 1987, Pat. No. 4,769,333. This application Dec. 15, 1987, Ser. No. 130,616
Int. Cl.[5] G01N 22/00; B01L 3/00
U.S. Cl. 422—58 4 Claims



1. A hand held assay device comprising:

a housing means,

a movable transport means within the housing means,

at least one liquid container within said housing means,

said container comprising a molded, flexible blister having an open side,

closure means spanning said open side to close and seal said blister,

punch means molded integrally with said blister defining with said blister a single, unitary, seamless piece part,

said punch means defining a cone having a base, a lateral surface and an apex,

the lateral surface of said cone being interrupted by a plurality of grooves of varying depth extending from said base to said apex,

the depth of said grooves being greatest at the base of said cone graduating to zero depth at the apex, and

said cone being operable in response to deformation of the blister to rupture the closure means whereby said cone, by virtue of said grooves, is operable to release liquid from said container in a predictable manner.

4,978,503

DEVICES FOR USE IN CHEMICAL TEST PROCEDURES

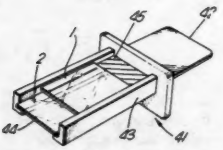
Ian A. Shanks, and Alan M. Smith, both of Bedford, England, assignors to Ares-Serono Research & Development Limited Partnership, Boston, Mass.

Continuation of Ser. No. 6/834,247, Feb. 7, 1986, abandoned. This application Sep. 6, 1988, Ser. No. 240,478

Claims priority, application United Kingdom, Jun. 13, 1984, 8415018; Jun. 13, 1984, 8415019

Int. Cl.[5] G01N *21/01*

U.S. Cl. 422—58 39 Claims



1. A sample collecting and testing device for use in the fluoroimmunoassay of an analyte present in sample liquid, said device comprising a planar capillary cell for the collection and retention of a volume of sample liquid to be tested therein, said capillary cell comprising a pair of flat, parallel plates fixed together with an air space therebetween and sealed along two opposite sides so as to provide fixed opposed inner surfaces defining a capillary cavity with a first aperture at one end thereof to allow uptake of sample liquid in the capillary cavity and a second aperture at the other end thereof to allow exit of air from the capillary cavity as it fills with sample liquid, wherein at least one of said plates is a light transmissive waveguide having an optically smooth edge which is transverse to the plane of the waveguide and perpendicular to the sealed sides thereof, said waveguide having bound to at least a portion of its inner surface, so as to be contacted by the sample liquid collected within the capillary cavity, an immobilised reagent capable of binding, either directly or indirectly, a fluorescent-labelled ligand, wherein said immobilised reagent and said fluorescent-labelled ligand is releasably retained within said device so as to be contacted by and released into the sample liquid collected therewithin.

25. A process for manufacturing sample collecting and testing devices for use in the fluorescent or luminescent immunoassay of an analyte comprising the steps of (a) immobilizing a reagent appropriate to the test to be carried out in the device onto portions of the surface of a transparent flat sheet material which is capable of acting as a light-transmissive waveguide and which is to provide a part of a multiplicity of the devices, (b) attaching to said sheet material an additional flat sheet material in parallel, spaced relation thereto so as to provide for each device of the multiplicity of devices a capillary cavity sealed along two opposite sides thereof and containing said immobilised reagent on at least a portion of the inner surface thereof, said capillary cavity adapted for collecting and retaining by capillarity a volume of sample liquid in contact with said immobilised reagent and (c) separating the assembled sheets into portions, each portion providing one or a plurality of the sample collecting and test devices, such that the transparent sheet material of each device has at least one optically smooth edge transverse to the plane of the sheet and perpendicular to the sealed sides thereof.

4,978,504

SPECIMEN TEST UNIT

Frederic L. Nason, 14610 Lanark St., Panorama City, Calif. 91412

Filed Feb. 9, 1988, Ser. No. 153,951

Int. Cl.[5] A61B *10/00*; C12M *1/28, 1/30*; G01N *31/20*

U.S. Cl. 422—61 11 Claims

1. A specimen test unit for use in collection and analysis of a biological specimen or the like, said test unit comprising:

a housing member having an outlet opening;

at least one test fluid within said housing member.

collecting means carried by said housing member collecting the specimen, said housing member including means for delivering a test fluid into direct contact with the specimen on said collecting means; and

a cap having an open end for mounting onto said housing member with said cap substantially enclosing said collecting means, said cap further having a second end with an outlet port therein, and at least one porous filter member disposed across and substantially closing said outlet port, at least one of said housing member and said cap being squeezable while said cap is mounted on said housing member to force the specimen and the test fluid from said collecting means through said at least one filter member.

4,978,505

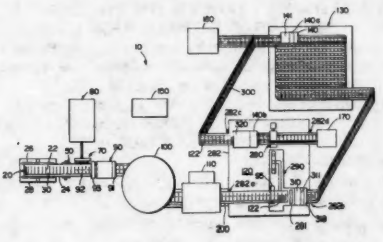
AUTOMATED SYSTEM FOR MICROPROPAGATION AND CULTURING ORGANIC MATERIAL

Malcolm G. Kertz, Sealy, Tex., assignor to Agristar, Inc., Conroe, Tex.

Continuation-in-part of Ser. No. 207,405, Jun. 14, 1988, which is a continuation-in-part of Ser. No. 21,408, Mar. 4, 1987, Pat. No. 4,908,315. This application Dec. 1, 1988, Ser. No. 278,681

Int. Cl.[5] G01N *21/00*

U.S. Cl. 422—66 18 Claims



1. An automated system for growing plant material, comprising:

a first length of membrane material having a plurality of open growing chambers;

a second length of membrane material having a plurality of plant-filled growing chambers filled with plant material;

a media preparation unit for mixing measured amounts of individual stock solutions to prepare a selected plant media;

a fill unit for dispensing media from said media preparation unit into said open growing chambers;

a fill check scanner unit for scanning the media-filled open growing chambers to ensure that each open growing chamber has been filled by said fill unit with a predetermined amount of media;

a sterilization unit for sterilizing said first length of media-filled open growing chambers;

a cooling and storage unit for cooling and storing said media-filled open growing chambers from said sterilization unit;

a plant culture room housing said second length of plant-filled growing chambers for growing the plant material under controlled conditions;

a growth detection scanner unit for scanning the plant-filled growing chambers housed in said plant culture room for determining the extent of plant growth within each said plant-filled growing chamber;

a surface sterilization unit for surface sterilizing said plant-filled growing chambers;

a cutting unit for opening said plant-filled growing chambers of said second length;

a removal unit for removing the plant material from said plant-filled growing chambers after said plant-filled growing chambers have been opened by said cutting unit;

a plant cutting unit for cutting the plant material into individual pieces after being removed from said plant-filled growing chambers by said removal unit;

a planting unit for planting individual pieces of plant material cut by said plant cutting unit into individual media-filled open growing chambers of said first length;

a closing unit for closing said media-filled open growing chambers after said chambers have been planted with said pieces of plant material; and

tractor feed apparatus for transporting said first and second lengths of growing chambers throughout the automated system.

4,978,506

CORROSION PRODUCT MONITORING METHOD AND SYSTEM

Andrew S. Calderwood, Forest Hills Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 18, 1988, Ser. No. 195,311
Int. Cl.[5] G01N *30/00*; B01D *36/00*
U.S. Cl. 422—73 **13 Claims**

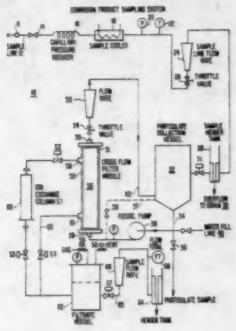
1. A system for monitoring non-soluble particulates separated from soluble components in a fluid system, comprising:

(a) means for sampling the fluid system of a nuclear power generator;

(b) a particulate collection vessel in fluid communication with the sampling means via a sample line;

(c) means, in fluid communication with the particulate collection vessel via a recirculation loop, for separating the soluble components from the non-soluble particulates and suspending the non-soluble particulates;

wherein the suspended non-soluble particulates are accumulated during operation of the recirculation loop in the particulate collection vessel; and



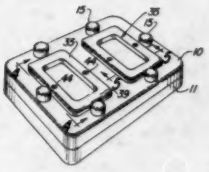
(d) means, in fluid communication with the particulate collection vessel, for detecting concentration of the suspended non-soluble particulates.

4,978,507

FLUID FLOW MANIFOLD FOR BLOT TYPE SCREENING APPARATUS

Andrew E. Levin, 145 Bishop Allen Dr., Cambridge, Mass. 02139

Filed May 31, 1988, Ser. No. 200,135
Int. Cl.[5] C12M *1/12, 1/20*; G01N *33/48*
U.S. Cl. 422—100 **13 Claims**



6. A manifold system for simultaneously flowing a fluid into and out of numerous parallel, elongated, narrow, shallow channels spaced apart to form separated reaction channels that are formed in a test apparatus plate, and wherein holes extend from the channels through the plate for separately introducing fluid into each channel, comprising:

an elongated, narrow groove formed in a face of the plate remote from the channels to provide a narrow, elongated socket which transversely overlaps the channels, and with the socket having a depressed base and a continuous socket forming wall, and with holes opening into the base of the socket;

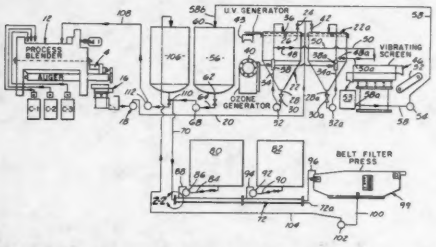
a manifold formed with an elongated plug shaped to closely fit into the socket for frictionally sealing against walls of the socket and with the plug having an inner face that is gapped from a base of the socket;

a passage formed through the manifold to its inner face for the flow of fluid through the manifold and into the socket for simultaneously introducing fluid through all of the holes opening into the socket base and thus into all of the channels.

4,978,508
METHOD AND APPARATUS FOR SOIL DECONTAMINATION

Andrew H. Hansen, Van Nuys; William C. Walker, Buena Park; Richard K. Walker, Pinole, and Sam Braly, Buena Park, all of Calif., assignors to Pacific Resource Recovery Corp., Van Nuys, Calif.

Filed Sep. 1, 1988, Ser. No. 239,278
Int. Cl.[5] B01J *19/08, 19/12*
U.S. Cl. 422—186.08 **4 Claims**



1. An apparatus for decontaminating soil which is contaminated with hazardous hydrocarbons, comprising:

(a) blending means for mixing the contaminated soil with water and a surfactant to form a slurry;

(b) first screening means operably interconnected with said blending means for removing from said slurry particles larger than a first predetermined size to form a small particle slurry;

(c) reactor means operably interconnected with said screening means for reacting said small particle slurry with ozone, said reactor means comprising:

(i) enclosure means for receiving said small particle slurry from said first screening means;

(ii) recirculating pump means for continuously recirculating said small particle slurry through said enclosure means; and

(iii) ozone generating means operably associated with said recirculating pump means for injecting ozone into said small particle slurry to form an ozone enriched slurry;

(d) illuminating means operably associated with said reactor means for illuminating said ozone enriched slurry with ultraviolet light;

(e) second screening means operably connected with said reactor means for removing particles larger than a second predetermined size from said ozone enriched slurry to form a fine particle slurry;

(f) mixer means operably interconnected with said second screening means for mixing floculating material with said fine particle slurry to form a floculated slurry;

(g) forming means for forming said floculated slurry into discrete segments.

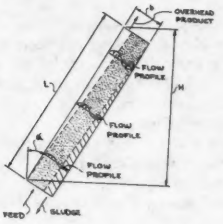
4,978,509
LAMELLA SETTLER CRYSTALLIZER

Arturo Maimoni, Orinda, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 931,825, Nov. 18, 1986, Pat. No. 4,735,872.
This application Nov. 13, 1987, Ser. No. 120,448
Int. Cl.[5] B01D *9/02*
U.S. Cl. 422—245 **14 Claims**

1. In an apparatus requiring separation of particles from a fluid circulating through the apparatus, and which particles are generated in the apparatus, the improvement comprising:

a lamella settler crystallizer which functions as a coarse product separation and removal means and as a low shear agglomeration/separation means, said crystallizer being connected at a lower end thereof to the apparatus to receive at least a portion of the fluid containing particles so as to separate particles above a predetermined size from the fluid as the fluid passes along a length thereof, and said crystallizer being connected at an upper end thereof to the apparatus to return the fluid containing particles below a predetermined size to be circulated through the apparatus, said crystallizer being positioned such that a longitudinal axis thereof is at an angle with respect to horizontal;



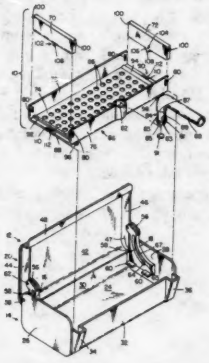
means for directing the fluid through said crystallizer; and

means connected to said lower end of said crystallizer for removing therefrom particles which have been separated from the fluid.

4,978,510
STERILIZING TRAY

Lawrence C. Smith, Sumner, Wash., assignor to Pascal Company, Inc., Bellevue, Wash.

Filed Jul. 18, 1988, Ser. No. 220,267
Int. Cl.[5] A61L *2/18;* **B65D** *1/34*
U.S. Cl. 422—310 **9 Claims**



1. A sterilizing tray for holding at least one object, wherein said sterilizing tray comprises: a base; a wall means for at least partially enclosing said base, wherein said wall means extend upwardly from said base, and wherein said wall means at least partially surround said base; at least one door means in said wall means, wherein said at least one door means is for selectively permitting the at least one object to exit said sterilizing tray, and wherein said at least one door means has a bottom; pivot means for pivotally mounting said at least one door means to said wall means; latch means, on at least one of said base and said at least one door means, said latch means for selectively latching said at least one door means closed; and release means, on at least one of said base and said at least one door means, said release means for selectively unlatching said at least one door means; wherein said sterilizing tray is adapted to be hand held by a user; and wherein at least a portion of said release means is sized to enable said portion of said release means to be urged against a work surface by said user sufficiently to unlatch said at least one door means, to permit said at least one object to exit said sterilizing tray through said at least one door means.

4,978,511
METHODS FOR SELECTIVELY RECOVERING VANADIUM FROM PHOSPHORIC ACID AND VANADIUM SOURCES

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 110,172, Oct. 19, 1987, Pat. No. 4,851,199, which is a continuation-in-part of Ser. No. 688,683, Jan. 3, 1985, abandoned. This application Jul. 20, 1989, Ser. No. 382,846

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.[5] C01G *31/02*

U.S. Cl. 423—65 **22 Claims**

1. A method for selectively recovering a simple vanadate from a vanadium-containing phosphoric acid solution containing impurity metals other than vanadium, which method comprises the steps of (a) converting said vanadium, at a pH of about 2 or less, to a simple vanadate compound insoluble in said phosphoric acid solution at a pH of about 2 or less, and (b) separating the resulting, insoluble, simple vanadate compound from said phosphoric acid solution, in the substantial absence of compounds other than said simple vanadate.

4,978,512
COMPOSITION AND METHOD FOR SWEETENING HYDROCARBONS

Edward T. Dillon, Pasadena, Tex., assignor to Quaker Chemical Corporation, Conshohocken, Pa.

Continuation-in-part of Ser. No. 289,352, Dec. 23, 1988, abandoned. This application Dec. 18, 1989, Ser. No. 452,539

Int. Cl.[5] C01B *17/05*

U.S. Cl. 423—226 **21 Claims**

1. A method for selectively reducing the levels of hydrogen sulfide and organic sulfides present in gaseous or liquid hydrocarbon streams or mixtures thereof comprising contacting said streams with a composition comprising the reaction product of (i) an alkanolamine comprising 1 to about 6 carbons with (ii) an aldehyde comprising 1 to about 4 carbons, for a period of time sufficient to reduce the levels of hydrogen sulfide and organic sulfides in said streams.

4,978,513
CATALYST FOR THE OXIDATION OF CARBON COMPOUNDS

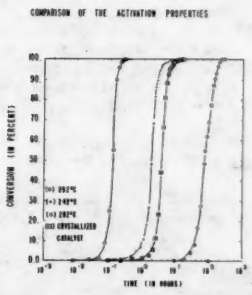
Alfons Baiker, Opfikon, and Daniel Gasser, Schaffhausen, both of Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

Division of Ser. No. 270,796, Jul. 13, 1988, Pat. No. 4,916,109. This application Jan. 4, 1989, Ser. No. 293,442

Claims priority, application Switzerland, Jul. 14, 1987, 2685/87

Int. Cl.[5] B01D *53/36*

U.S. Cl. 423—245.3 **8 Claims**



1. Process for the total oxidation of at least one compound selected from the class consisting of carbon monoxide, aliphatic hydrocarbons, aromatic hydrocarbons and aliphatic alcohols, comprising reacting the at least one compound in an oxygen-containing gas stream in the presence of an activated catalyst of the general formula $Pd_x(ZrO_2)_y$, wherein x is a number between 1 and 99, y is the difference between x and 100 and z is a value between 0.5 and 2, in the form of a crystalline or amorphous alloy, at a temperature between room temperature and 350° C. and at a pressure from normal pressure to 10 bars.

4,978,514
COMBINED CATALYTIC/NON-CATALYTIC PROCESS FOR NITROGEN OXIDES REDUCTION

John E. Hofmann, Stamford; William H. Sun, Wallingford, both of Conn., and Bryan K. Luftglass, South Salem, N.Y., assignors to Fuel Tech, Inc., Stamford, Conn.

Filed Sep. 12, 1989, Ser. No. 408,122

Int. Cl.[5] C01B *21/00*; **B01J** *8/00*

U.S. Cl. 423—235 **19 Claims**

1. A process for the reduction of nitrogen oxides in the effluent from the combustion of a carbonaceous fuel, the process comprising:

(a) introducing a nitrogenous treatment agent into the effluent at an effluent temperature between about 1200° F. and about 2100° F. and a molar ratio of treatment agent nitrogen to baseline nitrogen oxides level of about 1:10 to about 10:1, wherein said treatment agent further comprises an enhancer selected from the group consisting of hexamethylenetetramine, an oxygenated hydrocarbon, an ammonium salt of an organic acid, a heterocyclic hydrocarbon having at least one cyclic oxygen, a 5- or 6-membered heterocyclic hydrocarbon having at least one cyclic nitrogen, a hydroxy amino hydrocarbon, sugar, molasses, and mixtures thereof when the effluent temperature is below about 1600° F., and further wherein said treatment agent is introduced under conditions effective to create a treated effluent having reduced nitrogen oxides concentration, wherein the conditions under which said nitrogenous treatment agent is introduced are such that ammonia is present in the treated effluent; and

(b) contacting the treated effluent under conditions effective to reduce the nitrogen oxides in the effluent with a catalyst effective for the reduction of nitrogen oxides in the presence of ammonia.

4,978,515
PEROVSKITE FIBERS FROM BIMETAL COMPLEXES

Robert E. Johnson, Hoboken, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed May 20, 1987, Ser. No. 51,803

Int. Cl.[5] H01B *1/08, 12/00*; **C01F** *17/00, 11/00*

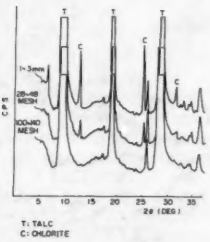
U.S. Cl. 423—263 **13 Claims**

1. A process for producing shaped perovskites, comprising: forming a shaped composition containing an organic fluid polymer having dispersed therein a solid perovskite precurser in powdered form, said perovskite precursor comprising at least one precipitated bimetallic complex of the formula A[BZ] wherein A and B are metals and Z is a ligand associated with metal B, heating said shaped composition at elevated temperatures and in an atmosphere sufficient to burn off said polymer and convert said perovskite precursor to a perovskite, said shaped composition having a sufficient amount of perovskite precursor powder dispersed therein to yield a shaped perovskite upon burning off said polymer.

4,978,516
PROCESS FOR TREATING TALC

Osamu Yamada, Tokyo, and Kozo Shinohara, Kawagoe, both of Japan, assignors to Asada Mill Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 157,928, Feb. 19, 1988, abandoned. This application Jul. 25, 1989, Ser. No. 385,312
Claims priority, application Japan, Oct. 26, 1987, 62-269956
Int. Cl.[5] C01B *33/24*; C01F *1/00*
U.S. Cl. 423—331 24 Claims

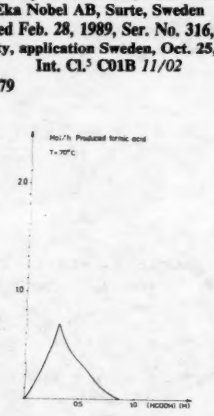


1. A process for improving both the degree of purity and whiteness of a talc powder comprising heating a talc powder having a particle size of about 0.8 millimeters or less containing at least one impurity selected from the group consisting of asbestos, dolomite, magnesite, chlorite and calcium carbonate, with a phosphoric acid agent in a concentration of about 85%, by weight, as H_3PO_4 at a temperature between 70° and 250° C. under atmospheric pressure to remove at least one of the aforementioned impurities therefrom by utilizing the difference in the rate of dissolution between the talc and said one or more impurities

4,978,517
PROCESS FOR THE PRODUCTION OF CHLORINE DIOXIDE

Maria Norell, and Björn H. Svedin, both of Sundsvall, Sweden, assignors to Eka Nobel AB, Surte, Sweden

Filed Feb. 28, 1989, Ser. No. 316,879
Claims priority, application Sweden, Oct. 25, 1988, 88038179
Int. Cl.[5] C01B *11/02*
U.S. Cl. 423—479 7 Claims

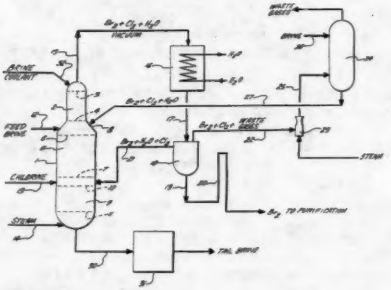


1. A process for production of chlorine dioxide by reacting in a reaction vessel an alkali metal chlorate, a mineral acid and methanol as a reducing agent in proportions to generate chlorine dioxide in a reaction medium maintained at a temperature from about 50° C. to about 100° C. and at an acidity within the interval from about 2 to about 11N and subjected to a subatmospheric pressure sufficient to effect evaporation of water, whereby a mixture of chlorine dioxide, water vapor and gaseous by-products is withdrawn from an evaporation region in the reaction vessel and alkali metal sulfate is precipitated in a crystallization region in the reaction vessel, wherein formic acid is produced as one of said gaseous by-products at a rate dependent on the concentration of formic acid in said reaction medium, the process including the step of maintaining a concentration of formic acid in the reaction medium at a level higher than that resulting in the maximum rate of production of formic acid as a gaseous by-product.

4,978,518
CONTINUOUS VACUUM PROCESS FOR RECOVERING VROMINE

Kenneth C. Lesher, and Herbert W. Henry, both of Magnolia, Ark., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 622,197, Jun. 19, 1984, Pat. No. 4,725,425. This application Jul. 21, 1987, Ser. No. 75,956
The portion of the term of this patent subsequent to Jan. 12, 2005, has been disclaimed.
Int. Cl.[5] B01D *3/10*; C01B *7/09*
U.S. Cl. 423—504 8 Claims



1. A continuous process for recovering elemental bromine from bromide-containing brine said process comprising:
(a) continuously introducing said bromide-containing brine into the upper portion of an enclosed chamber;
(b) continuously introducing chlorine and steam into the lower portion of said chamber whereby said chlorine contacts said bromide-containing brine in a counter current manner;
(c) continuously removing gaseous bromine and water from the top of said chamber;
(d) continuously removing bromide-depleted brine from the bottom of said chamber; and
(e) maintaining a sub-atmospheric pressure within said chamber.

4,978,519
PROCESS FOR PRODUCING ELEMENTAL SULPHUR

Jury S. Matros, ulitsa Zolotodolinskaya, 31, kv. 36.; Andrei N. Zagoruiko, ulitsa Tereshkovoi, 9, kv. 2.; Irina V. Malakhova, ulitsa Uchenykh, 8, kv. 12., all of Novosibirsk, and Oleg G. Eremin, ulitsa Ostrovityanova, 19, kv. 16., Moscow, all of U.S.S.R.

PCT No. PCT/SU87/00083, § 371 Date Jun. 2, 1988, § 102(e) Date Jun. 2, 1988, PCT Pub. No. WO88/02736, PCT Pub. Date Apr. 21, 1988
PCT Filed Jul. 27, 1987, Ser. No. 239,957
Claims priority, application U.S.S.R., Oct. 17, 1986, 4131466; Oct. 17, 1986, 4131457; Oct. 17, 1986, 4131455
Int. Cl.[5] C01B *17/04*
U.S. Cl. 423—574 R 3 Claims

1. A process for producing elemental sulfur from sulfur dioxide gas and hydrogen sulfide gas by introducing said gases at a temperature not lower than 120° C. into a catalyst bed, the

direction of flow of said gases being reversed periodically, the resulting gaseous sulfur being subsequently removed from the catalyst bed and condensed, the process being conducted in a catalyst bed divided into three parts in a plane perpendicular to the direction of flow of the gases, wherein into the first part of the catalyst bed, along the flow path of the gases, said gases are fed at a temperature of 300° C.–400° C.; into the second and third parts of the catalyst bed said gases are fed at a temperature of 120° C.–160° C., wherein intermixing and/or cooling of said gases, removal of gaseous sulfur, and condensation of the gaseous sulfur are effected between at least two parts of the catalyst bed; at least into one of the parts of the catalyst bed said gases are fed at a temperature below the dew point of sulfur; said reversal of the direction of flow of said gases being carried out in the second part of the catalyst bed when the temperature difference of said gases between the inlet and the outlet of said second part of said catalyst bed is equal to 50° C.–150° C.; the reversal of the direction of flow of said gases into all said parts of said catalyst bed being effected when the difference in the gas temperature between the inlet and the outlet from the third part of the catalyst bed along the flow path of the gases is in the range of 0.1° C.–5° C.

4,978,520

NOVEL METHOD FOR SELECTION OF PRIMATE TUMOR-ASSOCIATED ANTIGENS SUITABLE AS IN VIVO TARGETS FOR ANTIBODIES

Byron T. Ballou, Pittsburgh, Pa., assignor to University of Pittsburgh, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 906,161, Sep. 11, 1986, Pat. No. 4,798,719. This application Jan. 11, 1989, Ser. No. 295,775

Int. Cl.[5] A61K *49/02*; **G01N** *33/53*

U.S. Cl. 424—1.1 **7 Claims**

1. A process for the selection of antigens suitable as targets for antibodies which localize in a tumor in vivo comprising:

(a) preparing antibodies distinguishable from those present in the animal in which biofiltration is to occur and that bind to antigens present in the tumor to be targeted;

(b) injecting the prepared antibodies into a non-tumor-bearing primate, into a tumor-bearing animal, and into a non-tumor bearing animal of the same species as the tumor-bearing animal said primate being of a species other than the tumor-bearing or the non-tumor-bearing animal;

(c) recovering the biofiltered antibodies from each of the non-tumor-bearing primate and the tumor-bearing animal and the non-tumor-bearing animal;

(d) identifying antigens whose antibodies are not retained in vivo in the non-tumor-bearing primate and in the non-tumor-bearing animal using the recovered biofiltered antibodies; and

(e) comparing the antibodies that are not retained in vivo by the non-tumor-bearing primate and the non-tumor-bearing animal with those antibodies that are actually retained in vivo in the tumor-bearing animal to identify the antigens corresponding to those antibodies that are selectively retained in the tumor-bearing animal.

4,978,521

COLOR CODED FLAVORED DENTIFRICE TOOTHPOWDERS

John Duncan Blue, 605 Hama Dr., Holiday, Fla. 34691

Filed Jan. 3, 1990, Ser. No. 460,530

Int. Cl.[5] A61K *7/16, 7/18, 9/14*

U.S. Cl. 424—7.1 **9 Claims**

1. A color-coded and flavored dentifrice preparation wherein the dentifrice type is toothpowder selected from a group of color coded ingredients with each color-coded ingredient coordinated with its own flavor comprising an active ingredient of fluoride and mixtures thereof with ingredients selected from the group of ingredients comprising abrasive plaque, tartar, detergent, sweetener, coloring, flavoring.

4,978,522

ORAL COMPOSITIONS

Melvin A. Barbera; Francis O. Agricola, both of Cincinnati; Robert V. Faller, Amelia, and Worth D. Bowman, West Chester, all of Ohio, assignors to The Procter & Gamble Company, Cincinati, Ohio

Continuation of Ser. No. 106,479, Oct. 6, 1987, abandoned, and a continuation of Ser. No. 828,110, Feb. 10, 1986, abandoned. This application Mar. 9, 1989, Ser. No. 320,893

Int. Cl.[5] A61K *7/18, 7/22*

U.S. Cl. 424—52 **4 Claims**

1. An oral composition effective against caries comprising:

(a) an amount of a strontium disodium ethylenediamine tetraacetate, SrEDTA complex sufficient to provide from about 2 to about 900 ppm Sr^{++};

(b) an amount of a soluble fluoride ion source sufficient to provide from about 25 to about 50,000 ppm F^-; and

(c) a pharmaceutically acceptable carrier.

4,978,523

MELANIN INHIBITOR

Itsuro Motegi; Michio Kawai, both of Ichikaimachi; Genji Imokawa, Utsunomiya; Koichi Nakamura, Tochigi, and Naotake Takaishi, Utsunomiya, all of Japan, assignors to Kao Corporation, Tokyo, Japan

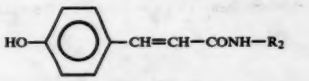
Continuation of Ser. No. 601,585, Apr. 18, 1984, abandoned. This application Dec. 24, 1985, Ser. No. 814,172

Claims priority, application Japan, Apr. 25, 1983, 58-71501; Mar. 12, 1984, 59-46849

Int. Cl.[5] A61K *7/42, 7/44*

U.S. Cl. 424—59 **3 Claims**

1. A melanin inhibitor which comprises (1) between 0.01 to 50 wt. % of a cinnamic acid derivative of the general formula



in which R_2 represents a hydrogen atom, an alkyl group having 1 to 24 carbon atoms, a cycloalkyl group or an alkenyl group and (b) a skin-treating base compatible with said cinnamic acid derivative.

4,978,524

GLOSSY COSMETIC PRODUCT AND METHOD OF PRODUCING SAME

Melvin E. Kamen, Highlands; Philip Bernstein, Glen Ridge, and Augustine Defazio, Englishtown, all of N.J., assignors to Revlon, Inc., New York, N.Y.

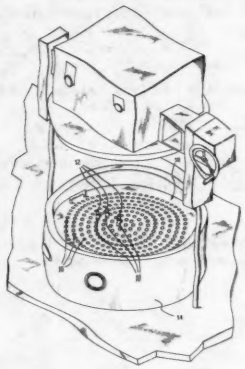
Filed Jan. 12, 1989, Ser. No. 296,230

Int. Cl.[5] A61K *7/021, 7/025, 7/027, 7/031*

U.S. Cl. 424—64 **14 Claims**

1. A wax-based cosmetic product made from a composition having a first wetting angle, comprising a first layer formed on the surface of said cosmetic product, said first layer being comprised of fluorine and having a second wetting angle which is less than said first wetting angle and a second layer

adhered to said first layer, said second layer being made from a material having an ultra-glossy finish and having poor adhe-



sion with objects having a wetting angle in the neighborhood of said first wetting angle.

4,978,525

AGENTS FOR PREVENTING THE FORMATION OF GRAY HAIRS

Yasuaki Ohyama, Onojo, Japan, assignor to Sansho Seiyaku Co., Ltd., Fukuoka, Japan

Filed Mar. 27, 1989, Ser. No. 328,997

Claims priority, application Japan, Mar. 31, 1988, 63-80536; May 13, 1988, 63-117410

Int. Cl.[5] A01K 7/06, 7/13

U.S. Cl. 424—70 5 Claims

1. A method of preventing the formation of gray hair comprising applying to the skin of a person's head an agent containing, as an active ingredient, an unsaturated fatty acid or an ester thereof represented by the following general formula:

A—COOR

wherein A is a radical of $CH_2{=}CH(CH_2)_n-$ or $CH_3(CH_2)_{10}CH{=}CH-(CH_2)_m-$, R is a hydrogen atom or alkyl group having 1 or 2 carbon atoms, n is an integer from 0 to 22, and m is an integer of 5 or 6.

4,978,526

HAIR AND SKIN CONDITIONING AGENTS AND METHODS

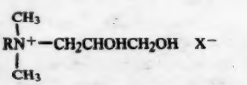
Bruce W. Gesslein, Piscataway, N.J.; Jacob J. Guth, Upper Black Eddy, Pa.; Gilbert R. Mintz, Cranbury; Gale M. Reinhart, Belford, both of N.J., and Laurence R. Smith, New York, N.Y., assignors to Inolex Chemical Company, Philadelphia, Pa.

Filed Sep. 26, 1988, Ser. No. 249,632

Int. Cl.[5] A61K 7/075, 7/15, 7/48

U.S. Cl. 424—70 28 Claims

1. In a clear conditioning composition for topical application to hair, the improvement comprising the presence in said composition of a quaternary ammonium salt of the formula:



(I)

wherein R is an alkyl group of about 7 to about 24 carbon atoms or an alkylamido group of the formula:

(II)

wherein R' is an alkyl group of about 7 to about 24 carbon atoms, Y is hydrogen or an alkyl group of 1 to 6 carbon atoms, z is about 2 to about 6, and X— is a counter-ion selected from the group consisting of a carboxylate group, chloride, bromide, sulfate and phosphate.

4,978,527

FILM-FORMING EMULSION CONTAINING IODINE AND METHODS OF USE

Robert H. Brink, Maplewood, and Chi-Ming Tseng, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 10, 1989, Ser. No. 334,366

Int. Cl.[5] A61K 31/74, 31/80, 33/18; A01N 59/10

U.S. Cl. 424—78 22 Claims

1. A film-forming emulsion, comprising:

(a) a substantially water resistant film-forming copolymer phase comprising A, B and C monomers wherein

A is a monomer wherein the corresponding homopolymer has a glass transition temperature less than about −15° C., and is present as about 15 to 80% of the total weight of all monomers in the copolymer,

B is a monomer wherein the corresponding homopolymer has a glass transition temperature of more than about −5° C., and is present as about 20 to 70% of the total weight of all monomers in the copolymer, and

C is a monomer capable of complexing iodine and delivering it to the skin and is present as about 1 to 15% of the total weight of all monomers in the copolymer;

(b) about 0.05 to 15% of iodine based on total emulsion weight;

(c) an effective amount of an emulsifying agent; and

(d) about 30 to 95% by weight of water; said monomers in the copolymer phase selected such that said emulsion, when applied to human skin in an amount sufficient to form a film having a thickness of about 0.01 mm., dries in less than five minutes to form a film having the properties of

(i) being hydrophobic, as determined by scrubbing the film using light finger pressure with a saline-soaked gauze for at least 40 scrubs with no observable removal of film or loss of iodine color, and

(ii) being capable of elongating at least about 5% before breaking.

4,978,528

PROCESS FOR PREVENTING DEGRADATION OF AN ANTI-BACTERIAL COMPOSITION

Francois Degre, Saint Affrique, France, assignor to Bio Serae Laboratoires S.A., Saint Affrique, France

PCT No. PCT/FR87/00232, § 371 Date Apr. 22, 1988, § 102(e) Date Apr. 22, 1988, PCT Pub. No. WO87/07838, PCT Pub. Date Dec. 30, 1987

PCT Filed Jun. 19, 1987, Ser. No. 165,193

Claims priority, application France, Jun. 23, 1986, 86 09166

Int. Cl.[5] A61K 37/50, 33/40

U.S. Cl. 424—94.4 11 Claims

1. Process for preventing degradation of an anti-bacterial composition, comprising individual encapsulating granules of a peroxide or one component of an oxidizing enzymatic system with a layer of water-soluble material and combining said encapsulated granules of peroxide or component of an oxidizing enzymatic system with lactoperoxidase and thiocyanate to form an intimate admixture of encapsulated granules, lactoperoxidase and thiocyanate, and where a component of an

oxidizing enzymatic system is used also combining the encapsulated granules with another component of the oxidizing enzymatic system, thereby to produce an anti-bacterial composition in which generation of oxygen is prevented prior to use.

4,978,529

EASILY DISPERSIBLE PSYLLIUM COMPOSITIONS

John Denick, Jr., R.D. 7, Box 372, Newton, N.J. 07860

Filed May 25, 1988, Ser. No. 198,256
Int. Cl.[5] A61K 35/78
U.S. Cl. 424—195.1 5 Claims

1. An ingestible powdered psyllium composition comprising powdered psyllium seed husks and a solvent selected from the group consisting of benzyl alcohol, propylene glycol, triacetin and mixtures thereof, wherein the solvent is uniformly distributed in the powdered psyllium seed husks and present in an amount from about 0.1% to about 12% by weight of said composition, said amount being effective to cause the powdered psysslium seed husks to rapidly and uniformly disperse in water.

4,978,530

SANITIZED, DISINFECTED AND SPORICIDAL ARTICLES, AND PROCESSES FOR SANITIZING, DISINFECTING AND RENDERING OBJECTS SPORICIDAL

Frank Strong, Mississauga, Canada, assignor to Health Care Products, Inc., Mississauga, Canada

Continuation-in-part of Ser. No. 858,816, May 2, 1986. This application Feb. 25, 1987, Ser. No. 18,516
Int. Cl.[5] A01N 25/34, 35/00, 35/02
U.S. Cl. 424—413 3 Claims

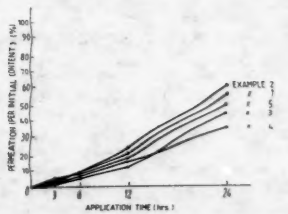
1. A package article having santizing and disinfecting properties comprising fabric impregnated with an aqueous glutaraldehyde solution consisting essentially of 0.005–0.30% glutaraldehyde 0.1–0.3% sodium lauryl sulfate, 0.25–0.75% glycerol, 0.25–0.75% phenol, 0.01–0.03% monopotassium phosphate, and 0.1–0.12% disodium.

4,978,531

CLEBOPRIDE TRANSDERMAL PATCH

Keiko Yamazaki, and Toshikuni Kawaji, both of Okawagun, Japan, assignors to Fordonal, S.A., Madrid, Spain

Filed Aug. 11, 1988, Ser. No. 231,034
Claims priority, application Japan, Aug. 13, 1987, 62-203311
Int. Cl.[5] A61F 13/02; A61L 15/06; A61K 9/70
U.S. Cl. 424—448 12 Claims



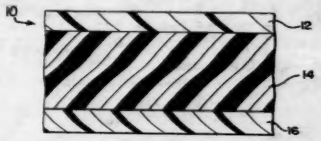
1. A transdermal patch having a drug reservoir layer on a backing sheet, the drug reservoir layer comprising an adhesive gel base containing clebopride or a pharmaceutically acceptable salt thereof, the adhesive gel base containing as essential components, a water-soluble polymer, water and a water-holding agent selected from the group consisting of glycerine, 1, 3-butane-diol, sorbitol maltitol, polyethylene glycol and a saccharide.

4,978,532

DOSAGE FORM FOR ADMINISTRATION OF DEHYDROEPIANDROSTERONE

Tahany El-Rashidy, Deerfield, Ill., assignor to Pharmedic Co., Wheeling, Ill.

Filed Aug. 11, 1989, Ser. No. 392,728
Int. Cl.[5] A61F 13/00
U.S. Cl. 424—448 13 Claims



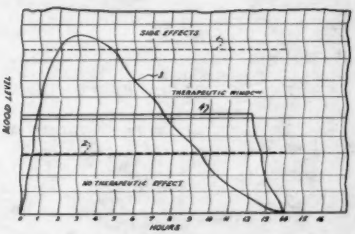
1. A dosage form for transdermal delivery of dehydroepiandrosterone which comprises an adhesive matrix constituted by a medical-grade pressure-sensitive silicone copolymer adhesive, the dehydroepiandrosterone distributed in said matrix in an amount in the range of about 1 to about 10 percent by weight of the matrix, and a permeation enhancer for said dehydroepiandrosterone present in said matrix in an amount in the range of about 1 to about 10 percent by weight of the matrix; said permeation enhancer being a carbocyclic compound with pendant hydroxyl groups and selected from the group consisting of butylated hydroxytoluene, butylated hydroxyanisole and hydroxypropyl-beta-cyclodextrin, and mixtures thereof.

4,978,533

LIQUID NIFIDIPINE COMPOSITION

Harry A. Dugger, Flemington, N.J., assignor to Pharmaconsult, Inc., Flemington, N.J.

Filed Nov. 1, 1988, Ser. No. 265,706
Int. Cl.[5] A61K 9/66
U.S. Cl. 424—456 5 Claims



1. In a method of treating coronary insufficiency with nifedipine which comprises administering an orally ingestible therapeutic dosage amount of said nifedipine contained as a fill in a gelatin capsule shell, the improvement comprising including in said capsule fill about 12–20 parts by weight of glycerin per part by weight of said nifedipine.

4,978,534

GABEXATE MESYLATE OINTMENT

Kazuo Saitoh, 14, 799-banchi, Kanegatani, Asahi-ku, Yokohama-shi, Kanagawa, Japan

Filed Dec. 6, 1988, Ser. No. 281,145
Claims priority, application Japan, Dec. 12, 1987, 62-314958
Int. Cl.[5] A61K 9/14
U.S. Cl. 424—484 26 Claims

1. A gabexate mesylate ointment comprising 0.01–8% by weight of gabexate mesylate, 25–80% by weight of white

vaseline, and 20–75% by weight of at least one viscosity controller selected from the group consisting of liquid paraffin, squalene and fatty acid ester containing 8–20 carbon atoms.

4,978,535

METHOD FOR CLEANING CONTACT LENSES

Perry A. Ractliff, 7125 E. Lincoln Dr., Scottsdale, Ariz. 85253

Division of Ser. No. 24,329, Mar. 10, 1987, Pat. No. 4,837,009, which is a continuation-in-part of Ser. No. 947,079, Dec. 23, 1986, Pat. No. 4,689,215, and a continuation-in-part of Ser. No. 17,241, Dec. 22, 1986, Pat. No. 4,696,811, which is a continuation-in-part of Ser. No. 846,342, Mar. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 636,027, Jul. 30, 1984, abandoned. This application Oct. 4, 1988, Ser. No. 252,127

Int. Cl.[5] A01N *59/08*; A61K *33/14*

U.S. Cl. 424—661 2 Claims

1. A method for cleaning contact lenses, said method consisting of the step of soaking a contact lens in a solution of stabilized chlorine dioxide having a concentration in the range of 0.05% to 0.2% in sterilized water.

4,978,536

NOVEL SYNTHETIC ALUMINUM SILICATE PREPARATION

Hidehiko Takahashi, Tokyo, Japan, assignor to Yakurigaku Chuo Kenkyusho, Tokyo, Japan

Filed May 17, 1988, Ser. No. 195,045

Claims priority, application Japan, May 19, 1987, 62-121674

Int. Cl.[5] A61K *33/06*

U.S. Cl. 424—684 1 Claim

1. A method of lowering the acidity of gastric juice or treating a gastric ulcer, which comprises administering to an animal in need of such therapy, an antacid effective amount of an aluminum silicate of the formula $xAl_2O_3.SiO_2.yH_2O$, wherein x=2–5 and y=18–20, obtained by reacting an aluminum compound and at least one compound selected from the group of silicic acid and water glass at a weight ratio $Al_2O_3:SiO_2$ of 4.5:1.0–6.0:1.0 in a strongly acidic aqueous solution having an initial pH of 1.0–3.0, adding a basic substance to provide an excess amount of alkali, and neutralizing to pH 5.0–7.0 with an acid.

4,978,537

GRADUAL RELEASE STRUCTURES FOR CHEWING GUM

Joo H. Song, Skokie, Ill., assignor to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Apr. 19, 1989, Ser. No. 340,384

Int. Cl.[5] A23G *3/30*

U.S. Cl. 426—5 27 Claims

1. A chewing gum which comprises:

a gum base;

a water soluble bulk portion; and,

a gradual release structure formed by melt spinning a mixture of active agent and spinnable polymeric wall material, having more than zero but less than about 55 percent by weight active agent, into a fiber, and cutting the fiber.

4,978,538

METHOD OF RIDDLING FERMENTED BOTTLED WINES

Ernest Gladstone, 721 Ave. O, Brooklyn, N.Y. 11230

Continuation-in-part of Ser. No. 352,991, May 17, 1989, Pat. No. 4,947,737. This application Apr. 16, 1990, Ser. No. 509,293

Int. Cl.[5] C12G *1/00*

U.S. Cl. 426—8 6 Claims

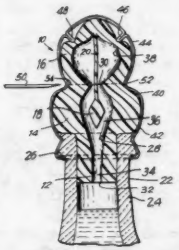
1. A method of riddling fermented, bottled wines, comprising the steps of:

(a) friction-tightly inserting a stopper into a neck of a bottle of wine to undergo fermentation within the bottle with concomitant production of sediment to be riddled from the wine;

(b) forming a first interior chamber in the stopper along a longitudinal direction, said first chamber having a pluggable opening and an opposite constantly-open opening;

(c) removably mounting a crown on the stopper, said crown having crown walls bounding a second chamber and movable from a retracted to an extended position;

(d) jointly moving with the crown walls, a movable plug along the longitudinal direction from an unplugged position in which the plug is remote from the pluggable opening when the crown walls are in the retracted position, to a plugged position in which the plug closes the pluggable opening when the crown walls are in the extended position;



(e) inverting the bottle in the unplugged position of the plug, and collecting virtually all of the sediment flowing through the first chamber into the second chamber;

(f) holding the crown walls in the retracted position and the plug in the unplugged position during sediment collection during the bottle-inverting step;

(g) releasing the holder, and moving the crown walls to the extended position and simultaneously moving the plug to the plugged position after the bottle-inverting step, thereby sealing the collected sediment within the second chamber and sealing the sediment-free wine in the bottle; and

(h) removing the crown and the sediment collected therein from the stopper.

4,978,539

PROCESS FOR OBTAINING ALCOHOLIC BEVERAGES FROM VEGETAL JUICE

Gerard Colin, St Emilion, and Michael Conroy, Cenac, both of France, assignors to La Compagnie Viticole et Fermiere Edmond et Benjamin de Rothschild S.A., Geneva, Switzerland

PCT No. PCT/FR87/00523, § 371 Date Aug. 29, 1988, § 102(e) Date Aug. 29, 1988, PCT Pub. No. WO88/05084, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 30, 1987, Ser. No. 261,828

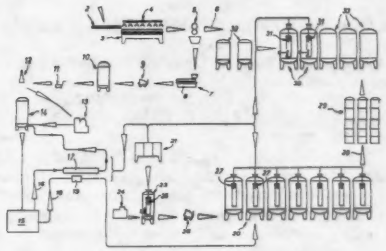
Claims priority, application France, Jan. 9, 1987, 87 00232

Int. Cl.[5] C12C *11/00*; C12G *1/00*

U.S. Cl. 426—11 15 Claims

1. In a process for obtaining alcoholic beverages from a vegetal juice naturally containing a sufficient content of at least one fermentable sugar, comprising pressing a vegetal substance and collecting a juice having a fermentable sugar content of between 80 and 230 g/liter, adjusting the pH of said juice between 3.5 and 4.3, sulfiting and clarifying the resulting juice by eliminating substantially all solid matter in suspension by filtration, adding a leaven to at least a part of the filtrate resulting from said filtration, effecting an alcoholic fermentation between 20° and 28° C. in a carbon dioxide atmosphere and recovering the product resulting from said fermentation, the improvement wherein said filtration comprises at least two successive filtration operations comprising a first filtration operation for removing solid matter in suspension of a size

greater than 1 mm and a second filtration operation by microfiltration with a filtrating membrane having a porosity



within the range of 0.2 to 0.4 μm thereby obtaining a sterile alcoholic beverage having a very low non-alcohol content as well as desirable organoleptic properties.

4,978,540

PRODUCTION OF FROZEN FOODS AND OTHER PRODUCTS

Tung-Ching Lee, 64 Higgins Dr., Kingston, R.I. 02881

Filed Jan. 20, 1988, Ser. No. 146,206
Int. Cl.[5] A23L 3/37
U.S. Cl. 426—61 23 Claims

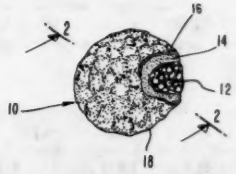
1. A process for freezing solid foodstuffs separated from a growing environment which comprises applying to the surface or cuts in said solid foodstuff a non-toxic microorganism having an INA+ phenotype or a biogenic ice nucleating agent or a functionally equivalent protein capable of inducing ice nucleation and lowering the temperature of said solid foodstuff to effect freezing thereof.

4,978,541

OIL-IMPERVIOUS, WATER RETAINING, SILICON OXIDE DERIVATIVE-CONTAINING FOOD ARTICLES

Richard J. Stypula, Colts Neck, and Lawrence Buckholz, Jr., Jackson, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation of Ser. No. 341,114, Apr. 14, 1989, abandoned, which is a continuation-in-part of Ser. No. 302,272, Jan. 27, 1989, which is a continuation of Ser. No. 114,697, Oct. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 93,352, Sep. 30, 1987, abandoned. This application Mar. 22, 1990, Ser. No. 497,188
The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.
Int. Cl.[5] A23L 1/317
U.S. Cl. 426—92 8 Claims



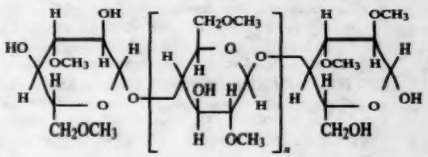
1. A food article of manufacture having:

(1) a porous inner food structure comprising water and macerated beef or macerated chicken meat and, optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_0 compatible with all reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers, hereinafter denoted as F_2, F_3, F_4, F_5 and F_6 as present in the article;

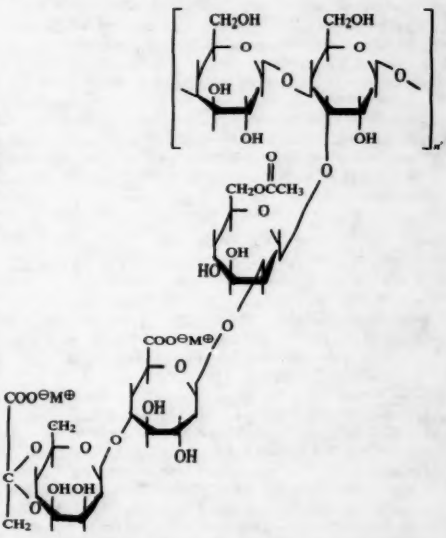
(2) a first outer surface contiguous with an internal part of said porous inner food structure; and

(3) fixedly coated on the entirety of said first outer surface, in the alternative:

(i) a first breading/barrier coating having a second outer surface consisting of an intimate admixture of flour, a starch, methyl cellulose having the structure:



wherein n represents repeating monomeric units; xanthan gum having the structure:



wherein M represents sodium, potassium or calcium and n' represents a group of repeating monomeric units and, optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_2; and fixedly coated on the entirety of said second outer surface, a first barrier coating consisting of an intimate admixture of a starch, methyl cellulose, xanthan gum and, optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_6;

(ii) a breading coating having a third outer surface comprising flour and, optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_3 and having the entirety of said third outer surface coated with a second barrier coating consisting of an intimate admixture of a starch, methyl cellulose, xanthan gum and, optionally, one or more silicon oxide derivatives and/or one or more reaction

flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_6;

(iii) a third barrier coating having a fourth outer surface consisting of an intimate admixture of a starch, methyl cellulose, xanthan gum and, optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_4; and fixedly coated on the entirety of said fourth outer surface a breading coating having a fifth outer surface comprising flour and, optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_6;

(iv) a second breading/barrier coating having a sixth outer surface consisting of an intimate admixture of (a) macerated beef or macerated chicken meat containing a fat and/or edible polyol polyester, (b) a starch, (c) methyl cellulose, (d) xanthan gum and (e) optionally, one or more silicon oxide derivatives and/or one or more reaction flavor compositions, reaction flavor precursors and/or reaction flavor enhancers F_5; wherein said food article of manufacture contains a silicon oxide derivative, the weight percent of silicon oxide derivative in any particular layer in which it is located in said food article being from about 0.2% up to about 0.6% based on the weight of the particular layer in which said silicon oxide derivative is located, said food article having the properties of:

(x) retention of a substantial quantity of the water originally contained in said porous inner food structure on storage and/or on cooking; and

(y) substantial imperviousness to the absorption or adsorption of cooking oil into said porous inner food structure when said food article is contacted with cooking oil on storage and/or on cooking.

4,978,542

METHOD FOR PREPARING FOOD HAVING REDUCED FAT CONTENT

John T. Buckley, 175 Sasco Hill Rd., Fairfield, Conn. 06430

Continuation-in-part of Ser. No. 194,477, May 16, 1988, which is a division of Ser. No. 911,113, Sep. 24, 1986, Pat. No. 4,745,854. This application Sep. 2, 1988, Ser. No. 239,700

Int. Cl.[5] A23L *1/01*

U.S. Cl. 426—243 **8 Claims**

1. A method of preparing food to reduce the fat content of the cooked food, said method including the steps of:

pre-cooking said food in a non-fat environment,

further cooking said pre-cooked food by spraying a predetermined quantity and concentration of a heating medium, including a heated oil, on said pre-cooked food sufficient to penetrate the outer surfaces of said pre-cooked food but insufficient to saturate said pre-cooked food with said heating medium, and

controlling the quantity and concentration of the heating medium sprayed on said food by mixing said heating medium with a liquid.

4,978,543

PROCESS FOR THE MANUFACTURE OF MICROWAVABLE OAT HOT CEREAL

Suja P. Finnerty, Arlington Heights, and Marvin K. Lenz, Algonquin, both of Ill., assignors to The Quaker Oats Co., Chicago, Ill.

Filed May 23, 1989, Ser. No. 355,774

Int. Cl.[5] A23L *1/00*

U.S. Cl. 426—243 **7 Claims**

1. A method for the preparation of a hot oat cereal in a microwave oven, comprising the steps: pregelatinizing oat groats to a level of between about 10% and 100% gelatinization, inclusive; adjusting the moisture level, if necessary for shelf storage; packaging the resulting product to provide a dry, packaged product; admixing at least a portion of the resulting product with water; and subjecting the resulting admixture to a cook cycle in a microwave oven.

4,978,544

FLOUR-BASED FOODSTUFFS WITH IMPROVED TEXTURE

James E. Sexton, Cincinnati, Ohio, assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Jul. 7, 1988, Ser. No. 216,032

Int. Cl.[5] A21D *2/00*

U.S. Cl. 426—243 **19 Claims**

1. A flour-based foodstuff consisting essentially of a uniform mixture of flour and a prolamine having low affinity for water upon storage separately added thereto throughout said mixture, said prolamine in an amount adapted to obtain a firm and flaky texture throughout the foodstuff upon cooking from a dough of said foodstuff.

4,978,545

PROCESS FOR THE CONTROLLED OXYGENATION OF AN ALCOHOLIC FERMENTATION MUST OR WORT

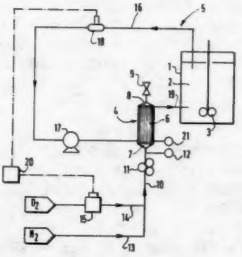
Jacques-Marcel Cutayar, Guyancourt; Dominique Poillon, Igny, and Sylvie Cutayar, Guyancourt, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et L'Exploitation des Procedes Georges Claude, Paris, France

Filed Mar. 21, 1989, Ser. No. 326,062

Claims priority, application France, Mar. 22, 1988, 88 03705

Int. Cl.[5] C12G *1/00*; A23B *7/144*

U.S. Cl. 426—312 **5 Claims**



1. A process for controlled oxygenation of alcoholic fermentation must or wort with a gas containing oxygen, comprising the steps of simultaneously applying the must or wort at a first pressure on one side of an oxygen-permeable membrane and applying the oxygen-containing gas at a second pressure on an opposite side of the membrane, controlling a supply of the oxygen-containing gas such that the partial pressure of oxygen in the gas is higher than the partial pressure of oxygen in the must or wort, maintaining a substantially constant ratio of the second pressure to the first pressure, and selectively regulating the oxygen content of the gas to achieve a desired degree of oxygenation of the must or wort.

4,978,546

COOLING LIQUID FOR FISH

Einar Haram, N-6072 Alisural, Lovenvoldsgate 11, Norway

PCT No. PCT/NO88/00049, § 371 Date Dec. 4, 1989, § 102(e) Date Dec. 4, 1989, PCT Pub. No. WO88/09620, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 3, 1988, Ser. No. 435,464

Claims priority, application Norway, Jun. 4, 1987, 872350

Int. Cl.[5] A23B *4/023*

U.S. Cl. 426—327 **20 Claims**

1. A method for preserving fresh fish without freezing, comprising:

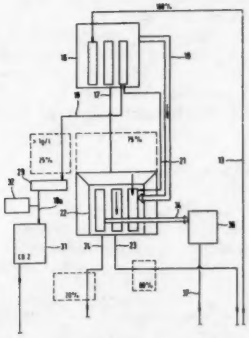
(a) treating the fish by contacting said fish with a cooling liquid comprising about 87 to 97 weight % water, about 0.5 to 1.5 weight % of at least one inorganic salt, about 2.0 to 9.5 weight % of at least one polyhydric alcohol, and about 0.5 to 2.0 weight % ascorbic acid;
(b) cooling the treated fish to a temperature below 0° C.; and
(c) storing the fish at the cooling temperature.

4,978,547

PROCESS FOR PRODUCING LOW-ALCOHOL WINE

Horst Petershans, Schillerstrasse 160, D-7050 Bittenfeld, Fed. Rep. of Germany

Filed Jun. 3, 1987, Ser. No. 57,601
Int. Cl.[5] C12G *3/12*; B01D *3/10*
U.S. Cl. 426—387 **16 Claims**



1. Process for producing low alcohol wine, said process consisting of feeding to a vacuum evaporator essentially only alcohol-containing wine,

evaporating said alcohol-containing wine in said vacuum evaporator so that a first mixture comprising water, alcohol and flavoring substance is separated from a second mixture having a low-alcoholic content;

drawing off said first mixture from said vacuum evaporator in a quantity substantially greater than 50% of the volume of said alcohol-containing wine; drawing off said low-alcohol second mixture from said vacuum evaporator and stabilizing said second mixture to prevent oxidation thereof;

feeding said low-alcohol second mixture into a mixing vessel;

separating water from said first mixture in a multistage flavor substance apparatus and drawing off a third mixture comprising alcohol and flavoring substance;

distilling alcohol from said third mixture;

feeding the resulting flavor substances, at least in part, into said mixing vessel; and

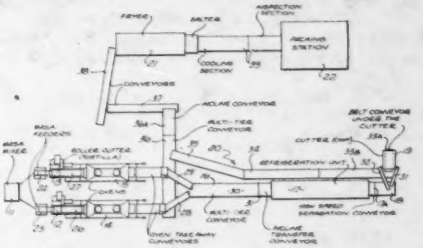
adding said water from said multistage flavor substance apparatus to said mixing vessel in an amount, which together with said low-alcohol second mixture and said flavor substances produces a quantity of low-alcoholic wine having an alcoholic content of less than 5 g./l.

4,978,548

METHOD AND APPARATUS FOR CONTINUOUS PRODUCING OF TORTILLA CHIPS

Johanthan C. Cope; Alan E. Davis; William B. Pitman, and Kathy M. Row, all of Madera, Calif., assignors to Valley Grain Products, Inc., Madera, Calif.

Filed Sep. 21, 1989, Ser. No. 410,492
Int. Cl.[5] A21C *15/00*; A47J *37/00*
U.S. Cl. 426—439 **16 Claims**



1. A method for continuous production of tortilla chips, including the steps of:

mixing tortilla flour and water to form a dough;

rolling the dough into a continuous sheet;

cutting tortilla shapes from the sheet;

moving the tortilla shapes continuously through a baking oven to produce baked products;

moving the baked products continuously along an equilibration conveyor to substantially equalize the moisture content of each baked product throughout the product to form an equilibrated product;

moving the equilibrated product continuously through a refrigerator unit to cool the product to form a cooled product;

cutting the cooled products into chip shapes; and

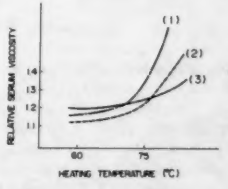
moving the chip shapes to a fryer to produce the tortilla chips.

4,978,549

METHOD FOR PRODUCING TOMATO PRODUCTS

Norihisa Takada; Saburo Kojima; Tadaaki Wakayama; Kyoko Omi; Nobuyuki Kobayashi, and Hideyuki Okada, all of Numata, Japan, assignors to Kikko Foods Corporation, Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,834
Claims priority, application Japan, Mar. 28, 1988, 63-72018; Mar. 28, 1989, 63-72017
Int. Cl.[5] A23L *2/00*
U.S. Cl. 426—489 **2 Claims**



1. A method for producing tomato juice which comprises crushing a tomato fruit, heating the crushed tomato to 60° to 85° C. at a heating rate of 4° C./sec. or higher, keeping the crushed tomato at said temperature for 2 to 15 minutes, extracting the juice from said crushed tomato and heating the juice at a temperature higher than 85° C. to inactivate residual en-

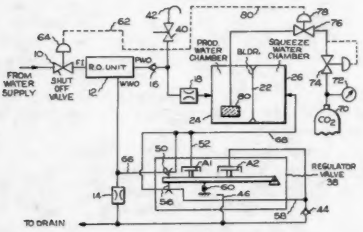
zymes, and subjecting the juice to deaeration and heat sterilization.

4,978,550

REVERSE OSMOSIS WATER PURIFICATION SYSTEM FOR PRODUCING CARBONATED WATER

Krishna S. Menon, Liverpool, and Rodger W. Beck, Cortland, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 3, 1990, Ser. No. 504,379
Int. Cl.[5] A21D *10/00, 13/00*
U.S. Cl. 426—549 22 Claims



1. The method comprising carbonating product water produced by a reverse osmosis water purification system having a reverse osmosis filter unit to which water is fed for purification therein and also having outlets for drain water and product water and a means for providing an alternative to separate carbonation tanks including sealed reservoir for collecting said product water under pressurization, by sensing the magnitude of pressurization of said product water in said reservoir, and introducing pressurized CO_2 gas into said product water when said pressurization reaches a certain magnitude.

4,978,551

SIMULATED FISH MEAT AND METHOD OF PRODUCING SAME

Yoshito Sugino, Ishikawa, Japan, assignor to Sugiyo Co., Ltd., Ishikawa, Japan

Filed Aug. 8, 1989, Ser. No. 390,881
Int. Cl.[5] A23L *1/05, 1/325*
U.S. Cl. 426—573 6 Claims

1. A method of producing a gel-like food product simulating raw fish meat, comprising the steps of:

preparing a mannan solution containing from 1% by weight to 15% by weight of mannan;

mixing surimi, fish meat, or both surimi and fish meat with common salt, a polysaccharide and a seasoning to form a fish meat protein mixture containing from 3% by weight to 15% by weight of fish meat protein, and kneading said fish meat protein mixture to form a fish meat paste;

mixing 1 part by weight of said mannan solution with from 0.2 to 4 parts by weight of said fish meat paste to form a paste mixture; and kneading the paste mixture to form a mass of uniform paste; and

heating said mass of uniform paste above 65° C. to form a heat-coagulated mass.

4,978,552

STARCH CONTAINING SWOLLEN FOODS

Toru Kurokawa, Fuchu; Hiroyuki Watanabe, Hachioji; Shoichi Tanaka, Shizuoka, and Fumito Mitsui, Koganei, all of Japan, assignors to Kewpie Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 128,698, Dec. 1, 1987, Pat. No. 4,891,238.
This application Oct. 24, 1989, Ser. No. 426,024
Claims priority, application Japan, Jun. 29, 1987, 62-159634
Int. Cl.[5] A21D *2/34;* A23L *1/164, 1/18*
U.S. Cl. 426—559 6 Claims

1. A swollen food predominantly comprising a starchy food material as the principal ingredient thereof and fine particles of porous structure having a particle size of 100 microns or less, said swollen food having an apparent bulk density of approximately 0.22 to 0.39 and a major proportion of cells or bubbles formed therein having a size in the range of from about 0.7 to 0.08 mm.

4,978,553

METHOD OF MAKING LOW-FAT BUTTER OR MARGARINE SPREAD AND RESULTING PRODUCT

Jules Silver, 7 Ridgewood Rd., Niantic, Conn. 06357

Filed Nov. 2, 1987, Ser. No. 115,767
Int. Cl.[5] A23C *15/02;* A23D *7/00*
U.S. Cl. 426—603 24 Claims

1. A method for the production of a smooth homogeneous spreadable low-fat butter or margarine product for use as a table spread which comprises:

(A) forming a relatively dry moisture-containing admixture of an edible protein and animal or vegetable fat said admixture containing at least about 8% protein which is sufficient to emulsify the fat to less than 14% protein which is sufficient to stabilize the fat against plasticization, from about 15% to about 50% fat, and about 40% to 60% moisture,

(B) plasticizing said admixture by subjecting said admixture to high speed sharp blade cutting action to cause a rupture of the fat globule membranes to form a homogeneous plastic mass which is spreadable both immediately upon removal from the refrigerator and at room temperature.

4,978,554

MARGARINE, SPREADABLE AT REFRIGERATION TEMPERATURE, AND HAVING A VERY LOW FAT CONTENT AND METHOD OF MANUFACTURING SAME

Jan-Åke Larsson, and Leif Johansson, both of Götene, Sweden, assignors to L & L International Sweden Aktiebolag, Stockholm, Sweden

Filed Oct. 12, 1988, Ser. No. 256,725
Claims priority, application Sweden, Oct. 13, 1987, 8703976
Int. Cl.[5] A23D *7/00*
U.S. Cl. 426—604 26 Claims

1. A low-calorie margarine having a fat content of between 19 and 38% by weight, said low-calorie margarine comprising, as calculated on the basis of the final product:

a water phase having a protein concentrate as a main ingredient, said water phase further comprising a heat treated and ripened solution of between 2 and 6% by weight of starch and between 0.02 and 0.05% by weight of an emulsifier solubilized in a solvent, which solution, after having been heat treated and ripened, is mixed with about 55–60% by weight of a protein concentrate having a protein content of 12–14%, and

a fat phase comprising cured fats or a mixture of cured fats and uncured fats and an emulsifier, said fat phase comprising fats in a content of between 19 an 38% by weight and between 0.75 and 1.25% by weight of said emulsifier, and wherein

said low calorie margarine is manufactured by emulsification of said water phase in said fat phase to directly provide a water in oil emulsion which is pasteurized, cooled and packed.

4,978,555

METHOD FOR DE-VITALIZING SEED

Michael E. Bley, Minneapolis, Minn., assignor to Golden Valley Microwave Foods, Inc., Edina, Minn.

Filed Jul. 27, 1989, Ser. No. 386,514
Int. Cl.[5] A23L *1/36*; A23B *9/20*
U.S. Cl. 426—627 **15 Claims**

1. A method for devitalizing seeds comprising:

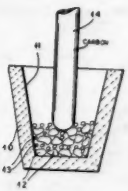
exposing said seed to an inert gas and heat of at least about 40° C. for a period of time effective to terminate seed respiration without substantially reducing product quality of said seed.

4,978,556

ELECTRODE FOR VAPOR DEPOSITION AND VAPOR-DEPOSITION METHOD USING SAME

Eduard Pinkhasov, Eastchester, N.Y., assignor to Vapor Technologies Inc., Mount Vernon, N.Y.

Division of Ser. No. 220,549, Jul. 18, 1988. This application Jan. 25, 1990, Ser. No. 470,976
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—37 **5 Claims**



1. A method of making an electrode for arc-vapor deposition which comprises an electrode body consisting essentially of slightly sintered coarse pieces of an electrode material; and a shank of a material of high conductivity different from said electrode material and extending into said body, said method comprising the steps of:

placing broken pieces of said electrode material in a form to form a sinterable mass and inserting into said mass a conductive rod adapted to form said shank in said mass, and

subjecting said mass and said rod to sintering in a vacuum furnace for a period sufficient to slightly sinter the particles with the electrode material together into a coherent mass.

4,978,557

METHOD OF ARC SPRAYING

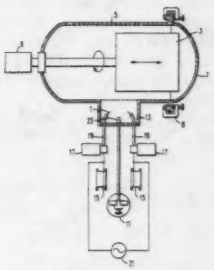
Curtis L. Drake, Elizabeth Township; Allegheny County; Francis L. Przywarty, Jefferson Boro, and Robert L. Ammon, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 268,100, Nov. 7, 1988, abandoned. This application Feb. 12, 1990, Ser. No. 478,727
Int. Cl.[5] B05D *3/06*, *1/08*
U.S. Cl. 427—37 **4 Claims**

1. A method of improving arc spray deposition of a metal overlay on a mandrel comprising the steps of:

providing a mandrel of a material which has high thermal conductivity to rapidly remove heat from the overlay; and

providing a mandrel with a surface finish having a roughness which is tailored to the overlay being formed, a surface roughness of about 16 rms, root mean square or less when a fiber reinforced metal matrix composite monotape is being formed and a surface roughness in the range of about 50 rms, root mean square, or more when a thin foil is being formed, in order to capture and hold the overlay when it is being formed and to allow the formed overlay



to be stripped from the mandrel without damaging the overlay.

4,978,558

METHOD FOR APPLYING DIFFUSION COATING MASKS

Foster P. Lamm, South Windsor, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 10, 1988, Ser. No. 204,815
Int. Cl.[5] C23C *16/00*
U.S. Cl. 427—250 **7 Claims**

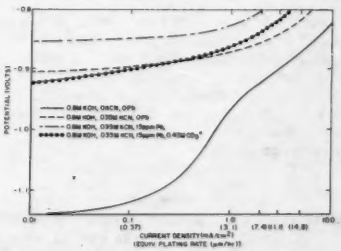
1. A method for applying a metal coating onto the surface of a metal substrate comprising the step of injection molding a masking mixture onto a portion of said surface, wherein the masking mixture is characterized by no volatilizable solvents and comprises solid particles effective in preventing deposition of the coating onto the substrate surface an a moldable amorphous thermoplastic resin, and then diffusing the coating onto the unmasked portion of the substrate.

4,978,559

AUTOCATALYTIC ELECTROLESS GOLD PLATING COMPOSITION

Charles D. Iacovangelo, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 3, 1989, Ser. No. 431,360
Int. Cl.[5] C23C *18/00*
U.S. Cl. 427—304 **14 Claims**



1. An aqueous autocatalytic electroless gold plating composition comprising about 0.002 to about 0.05M of a water-soluble alkali metal monovalent gold cyanide complex, about 0.01 to about 0.1M of a water-soluble cyanide compound, about 0.1 to about 1.0M of a carbonate compound, and about 0.01 to about 0.1M of a reducing agent selected from the group consisting of water soluble alkali metal borohydrides and water

soluble amine boranes, the plating composition having a pH within the range of about 10 to about 14.

4,978,560

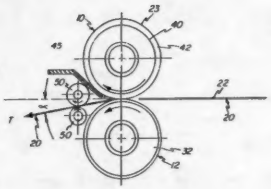
HOT ROLL GLOSSER METHOD WITH GLOSSING TEMPERATURE BELOW FREE AIR GLASS TRANSISTION TEMPERATURE OF RESIN UTILIZED

Benjamin C. Stone, Alpha, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 379,459, Jul. 13, 1989, abandoned. This application Feb. 22, 1990, Ser. No. 483,155

Int. Cl.[5] B05D *3/12*

U.S. Cl. 427—366 **3 Claims**



1. The method of transparentizing microencapsulated media material having a copolymer phenolic or vinyl glossing resin on a surface thereof with a free air glass transition temperature of T_9 comprising the steps of:

applying said material to the nip of a pair of rotating heated cylindrical pressing rolls in which the resin surface comes into contact with the surface of an elastomer covered roll in a nip, and in which the surface of said elastomer covered roll has a low surface energy in the order of 25 dynes per centimeter,

heating said rolls to maintain a nip temperature of at least 5° C. below T_9, and

maintaining a pressure in said nip between about 4–15 pli.

4,978,561

TREATMENT OF FIBROUS MATERIALS

Stephen E. Cray; James McVie, both of South Glamorgan, Wales, and Paul A. Yianni, Limal, Belgium, assignors to Dow Corning Limited, Barry, Wales

Filed May 17, 1989, Ser. No. 353,313

Claims priority, application United Kingdom, May 17, 1988, 8811602; Feb. 9, 1989, 8902938

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—387 ***23 Claims***

1. A method of treating fibrous material which comprises applying to the fibrous material a composition comprising a polydiorganosiloxane having a group $=NCO(CHR)_nOH$ connected with a silicon atom of a siloxane unit of the *polydiorganosiloxane wherein R represents* a hydrogen atom, a hydroxyl group, or a hydrocarbon group or a hydroxyl substituted hydrocarbon group and n has a value *in the range 2 to 7.*

4,978,562

COMPOSITE TUBULAR DOOR BEAM REINFORCED WITH A SYNTACTIC FOAM CORE LOCALIZED AT THE MID-SPAN OF THE TUBE

Joseph S. Wycech, Grosse Pointe Woods, Mich., assignor to *MPA Diversified Products, Inc., St. Clair Shores, Mich.*

Filed Feb. 5, 1990, Ser. No. 475,396

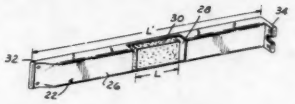
Int. Cl.[5] B32B *1/06, 1/08;* **B60J** *5/00;* **C08J** *9/22*

U.S. Cl. 428—35.8 ***20 Claims***

1. A lightweight, composite reinforcing door beam adapted to be mounted in the cavity of a motor vehicle door which has an outer panel and an inner panel, the door beam providing structural reinforcement in the form of increased side-impact resistance when mounted in the cavity of the vehicle door, the door beam comprising:

a metal tube having a longitudinal axis and having a bore coextensive therewith;

a resin-based core disposed in said bore of said metal tube, said bore occupying not more than one-third of the length of said bore;



said core being positioned substantially at the mid-span of said metal tube;

said core being held in place in said bore of said tube; and

first and second mounting means disposed at opposite ends of said body and adapted for mounting the door beam in the cavity of the vehicle door, with the longitudinal axis of the door beam positioned horizontally with respect to the vehicle door, thereby increasing the side-impact resistance of the vehicle door.

4,978,563

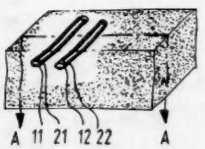
SELF REPAIRING ELASTIC BODIES

Claes M. C. Sandels, Sandhamnsgatan 21, Stockholm, Sweden

Filed Feb. 7, 1989, Ser. No. 306,898

Int. Cl.[5] B29C *73/22;* **B32B** *35/00*

U.S. Cl. 428—63 **2 Claims**



1. An elastic body consisting of rubber or synthetic material with an arbitrary shape essentially keeping its elastic qualities after being damaged by a blow, hits, cracking or external pressure change, said elastic body containing a plurality of hollow spacings in the form of tubes extending in random directions throughout the body, said tubes being uniformly distributed inside the body and having an arbitrary crosssection essentially smaller than an overall dimension of the body, at least some of said tubes including organ means for enclosing a foamable a liquid medium wherein at a sudden pressure change said organ means breaks and said foamable liquid medium expands to a foam which rapidly congeals filling its associated surrounding tube and a possible empty space created by said damage of the elastic body.

4,978,564

SELF-DEPLOYING STRUCTURAL ELEMENT

Craig Douglas, Lexington, Mass., assignor to University of Lowell, Lowell, Mass.

Filed Apr. 27, 1989, Ser. No. 344,259

Int. Cl.[5] B32B *3/26*

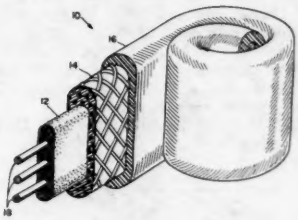
U.S. Cl. 428—71 **21 Claims**

1. A self-deploying structural element comprising:

an inner core of temperature sensitive expanding foam;

an advanced composite material around the core, the ad-

vanced composite material comprising an organic matrix composite with high modulus fibers;
a retaining jacket around the composite material; and



a heat generating means for heating the core of the structural element.

4,978,565

ABSORBENT LAMINATED SHEET AND MANUFACTURING PROCESS FOR SUCH A SHEET

Raymond Pigneul, Durrenentzen; Rémy Ruppel, Horbourg, and Pierre Laurent, Kunheim, all of France, assignors to Beghin-Say SA, Thumeries, France

Filed Sep. 16, 1987, Ser. No. 97,153
Claims priority, application France, Oct. 2, 1986, 86-13769
Int. Cl.[5] B32B *3/00*; B31F *1/20*; D21H *11/00*
U.S. Cl. 428—156 **5 Claims**

1. An absorbent laminated sheet comprising at least two embossed plies constituted essentially of cellulose fibers, bonded to each other by the protruding elements that are embossed in said plies and pointing inward to said sheet, an adhesive being deposited on the embossed surface at a rate lower than 1 gsm, said protruding elements being linear with a width between about 0.7 and 0.9 mm and designed to reproduce figures covering a surface area between about 2 and 4 cm^2 that are spaced from each other and separated with regions without embossments, said embossed area representing 40% to 60% of the surface of each figure.

4,978,566

COMPOSITE BEVERAGE COASTER

Robert S. Scheurer, 1627 Midwestern Pkwy., Wichita Falls, Tex. 76302, and Robert G. Heavers, Aurora, Colo., assignors to Robert S. Scheurer, Wichita Falls, Tex.

Filed Jul. 5, 1989, Ser. No. 375,490
Int. Cl.[5] B32B *3/26*; A47G *29/00*
U.S. Cl. 428—157 **7 Claims**

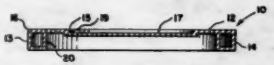
1. A composite coaster for use with a beverage container comprising a first substrate of open cell foam material and a second substrate of polymeric fabric material, the first substrate of open cell material being superposed onto the second substrate of polymeric fabric material, and being bonded thereto.

4,978,567

WAFER HOLDING FIXTURE FOR CHEMICAL REACTION PROCESSES IN RAPID THERMAL PROCESSING EQUIPMENT AND METHOD FOR MAKING SAME

Michael B. Miller, DeSoto, Tex., assignor to Materials Technology Corporation, subsidiary of the Carbon/Graphite Group, Inc., Rowayton, Conn.

Filed Mar. 31, 1988, Ser. No. 175,707
Int. Cl.[5] B32B *3/02*; C23C *16/00*
U.S. Cl. 428—157 **8 Claims**



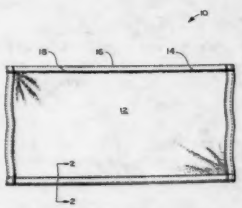
1. A wafer holding fixture of low thermal mass having a planar surface containing a recess capable of receiving a wafer and a sidewall having a height greater than the depth of said recess, said sidewall being connected to the edge of said planar surface sufficiently remote from said recess to provide rapid thermal response of the wafer that is at least four times more rapid than chemical vapor deposited coated graphite wafer holding fixtures sufficiently remote from said recess to provide rapid thermal response of the wafer that is at least four times more rapid than chemical vapor deposited coated graphite wafer holding fixtures and said planar surface and said sidewall consisting essentially of silicon carbide obtained by chemical vapor deposition of a coating of silicon carbide onto a substrate and removing the substrate, said fixture for use in a rapid thermal processing apparatus and said planar surface having a thickness in the range of about 0.015 inch to about 0.025 inch.

4,978,568

FLEXIBLE WRITING SURFACE

Robert C. Postma, Greensboro, N.C., assignor to Hach Associates, Inc., Winston Salem, N.C.

Continuation-in-part of Ser. No. 229,908, Aug. 8, 1988. This *application Feb. 22, 1989, Ser. No. 313,801*
Int. Cl.[5] B32B *9/00*
U.S. Cl. 428—192 **9 Claims**



1. A flexible writing surface comprising a four-sided flexible sheet material having a coating composition thereon characterized by its adherence to said flexible sheet material so as to provide a durable chalk writing and marking surface thereon, said flexible writing surface further comprising flexible dust collecting means extending along and adjacent to at least two sides of said flexible sheet material.

4,978,569

PROCESS FOR PREPARING SELECTIVELY METALLIZED ARTICLES

Gerald T. Keep, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 14, 1989, Ser. No. 393,427
Int. Cl.[5] B44C *1/22*; B05D *5/12, 3/04*; B29C *37/00*
U.S. Cl. 428—209 12 Claims

1. Process for producing a selectively metallized article comprising

(a) contacting a polymeric substrate with an organic solvent for said polymeric substrate for a time sufficient to swell the surface of said substrate,

(b) contacting said substrate with an aqueous solution of a strong base or strong acid for a time sufficient to stress-crack the substrate,

(c) repeating step (a) or steps (a) and (b) any number of times,

(d) etching the substrate, and

(e) electroless plating said substrate to obtain a selectively metallized article.

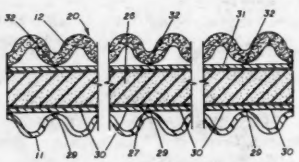
9. A selectively metallized article produced by the process of claim 1.

4,978,570

GARMENT WITH FOAM CUSHION ELASTIC CLOSURE

Hans E. Heyn, North Barrington, Ill., and Russell H. Narramore, Humble, Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Jun. 6, 1988, Ser. No. 203,394
Int. Cl.[5] D03D *3/00*; A61F *13/16*
U.S. Cl. 428—231 3 Claims



1. A composite film structure comprising

(a) a first substantially inelastic film panel

(b) a second substantially inelastic film panel having an end portion arranged in overlapping relationship with an end portion of the first panel and being secured thereto along parallel and side-by-side bond lines such that the first and second panels between the bond lines define a sleeve;

(c) an elastomeric strip secured to one of said panels within the sleeve at a plurality of longitudinally spaced bond locations, such that in the stretched position of the elastomeric strip, the panels and the elastomeric strip are substantially flat and parallel, and in the contracted position of the elastomeric strip, the panel gathers between the bond locations; and

(d) a foam strip mounted in said sleeve and having a central portion secured to a central portion of the elastomeric strip, the sleeve being movable longitudinally outwardly and inwardly from the secured central portion relative to the foam strip, the foam strip being substantially less elastic than the elastomeric strip and having a length at least 50% of the length of the sleeve in the extended position of the elastomeric strip and not greater than the length of the sleeve in the contracted position of the elastomeric strip.

4,978,571

CARBONACEOUS FIBER OR FIBER ASSEMBLY WITH INORGANIC COATING

Francis P. McCullough, Jr.; Steven L. Brewster, both of Lake Jackson; R. Vernon Snelgrove, Damon, all of Tex., and George C. Higgins, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 163,919, Mar. 4, 1988, Pat. No. 4,902,563.
This application Jun. 14, 1989, Ser. No. 366,804
The portion of the term of this patent subsequent to Jul. 27, 2006, has been disclaimed.
Int. Cl.[5] B32B *15/14*; D03D *15/00*; D04D *1/20*; D04H *1/00*
U.S. Cl. 428—263 9 Claims

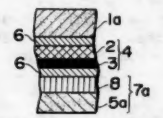
1. An oxygen and thermally stable woven, non-woven or knit fabric comprising carbonaceous fibers with a metal surface coating thereon, said carbonaceous fibers comprising resilient shaped reforming elongatable non-linear non-flammable carbonaceous fibers, said fibers having a reversible deflection ratio of greater than 1.2:1 and an aspect ratio greater than 10:1.

4,978,572

LAMINATED FILM

Mutsuo Akao, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 253,585, Oct. 5, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 464,663
Claims priority, application Japan, Oct. 5, 1987, 62-249890
Int. Cl.[5] B32B *5/16, 15/08*
U.S. Cl. 428—323 7 Claims



1. A laminated film which comprises an uniaxially molecular oriented thermoplastic resin film layer which is a laterally or obliquely uniaxially molecular oriented HDPE resin film having a thickness of more than 7 μm containing 0.3 to 30 wt. % of white inorganic particles having a mean particle size of 0.01 to 50 μm, an ethylene copolymer resin film layer containing more than 10 wt. % of ethylene copolymer resin, a substance having antiblocking action and an antioxidant and having a melting point of lower than said uniaxially molecular oriented thermoplastic resin film layer, and a metallized thermoplastic resin film layer interposed between said uniaxially molecular oriented thermoplastic resin film layer and said ethylene copolymer resin film layer.

2. The laminated film of claim 1 wherein said white inorganic particles are selected from the group consisting of titanium oxide, clay, mica, alumina, calcium silicate, aluminum hydroxide, calcium carbonate and barium sulfate.

4,978,573

ULTRATHIN POLYIMIDE POLYMER FILMS AND THEIR PREPARATION

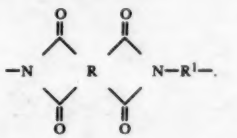
Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Division of Ser. No. 355,711, May 22, 1989, Pat. No. 4,929,405, which is a continuation-in-part of Ser. No. 339,903, Apr. 17, 1989, Pat. No. 4,880,699, which is a continuation of Ser. No. 267,712, Nov. 4, 1988, abandoned, which is a continuation of Ser. No. 149,824, Jan. 29, 1988, abandoned, which is a division of Ser. No. 917,731, Oct. 10, 1986, Pat. No. 4,746,474. This application Mar. 15, 1990, Ser. No. 494,083

Int. Cl.[5] B29C *41/12*

U.S. Cl. 428—333 22 Claims

1. A pinhole-free, polyimide polymer film having a thickness of about 400 angstroms or less said polyimide polymer comprising repeating units of the formula:



wherein R is a tetravalent organic radical and R^1 is a divalent organic radical selected from the group consisting of aromatic, aliphatic, cycloaliphatic, heterocyclic, combinations of aromatic and aliphatic, and substituted groups thereof, R, or R^1, or both containing a fluorine substituent.

4,978,574

FORMATION OF ORGANIC MEMBRANES

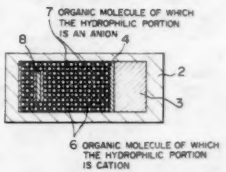
Norihisa Mino, Settsu, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 1, 1990, Ser. No. 486,913

Claims priority, application Japan, Mar. 3, 1989, 1-052283

Int. Cl.[5] B05D *1/20*

U.S. Cl. 428—333 7 Claims


7 ORGANIC MOLECULE OF WHICH THE HYDROPHILIC PORTION IS AN ANION
8
4
2
3
6 ORGANIC MOLECULE OF WHICH THE HYDROPHILIC PORTION IS CATION

1. A method for forming a monomolecular membrane on a substrate which comprises the steps of

(1) mixing

(a) at least one substance having a watersoluble polar head (hydrophilic portion) and a waterinsoluble organic tail (hydrophobic portion) in the molecule, the head being ionizable into a cation when spread on water, and

(b) at least one substance having a watersoluble polar head (hydrophilic portion) and a waterinsoluble organic tail (hydrophobic portion) in the molecule, the head being ionizable into an anion when spread on water, to obtain a mixture,

(2) developing the mixture on an aqueous subphase to form a monomolecular layer, and

(3) transferring the monomolecular layer to a substrate while applying a surface pressure on the layer.

4,978,575

METHOD FOR THE PRODUCTION AND PROCESSING OF REACTANT MIXTURES OF PLASTICS

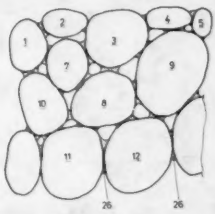
Karl R. Ziess, Feldbergstrasse 24 G, 7800 Freiburg, Fed. Rep. of Germany

Filed Jul. 8, 1988, Ser. No. 216,474

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722897; Oct. 17, 1987, 3735283; Oct. 19, 1987, 3735360; Nov. 4, 1987, 3737413

Int. Cl.[5] B32B *5/16*

U.S. Cl. 428—402 9 Claims



1. A method for the production of a porous product comprising at least one reactant synthetic resin and at least one filler material, said method comprising the steps of:

producing reactant synthetic resin particles of a temperature below the reaction temperature of the synthetic resin;

mixing the reactant synthetic resin particles with particles of at least one filler material with the volume of the individual reactant synthetic resin particles being at most approximately one-twentieth of the volume of the individual filler material particles; and

heating the reactant synthetic resin particles to at least the reaction temperature thereof so as to form a porous product having unfilled spaces in the interstices thereof, and wherein the synthetic resin particles form bridges between discrete contact points or areas on the surfaces of the adjacent particles of filler material.

4,978,576

SURFACE MODIFIED, U.V. STABILIZED, POLYVINYL CHLORIDE ARTICLE

Joseph Silbermann, Old Bridge, and Michael T. Burchill, Cranbury, both of N.J., assignors to M&T Chemicals, Inc., Woodbridge, N.J.

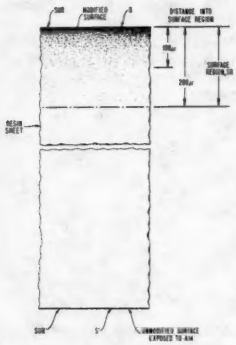
Continuation of Ser. No. 76,629, Jul. 23, 1987, Pat. No. 4,865,880, which is a continuation-in-part of Ser. No. 945,595, Dec. 23, 1986, Pat. No. 4,770,905, which is a continuation-in-part of Ser. No. 945,757, Dec. 23, 1986, abandoned. This application Jan. 18, 1989, Ser. No. 298,529

Int. Cl.[5] B32B *27/00, 27/16*

U.S. Cl. 428—409 8 Claims

1. A UV stabilized article comprising a polyvinyl chloride resinous sheet which includes about 0.5 to about 8 phr of a white pigment selected from an inorganic metallic oxide, sulfate or carbonate, the surface region of only one side of said sheet being stably modified in decreasing concentration with a stabilizing amount of an ultraviolet light stabilizer which is 0.3 to 10.7 g/m^2 of the surface area of the sheet and at least 70% of said stabilizing amount being present in the first 100 microns of said surface region, the exposed surfaces being substantially free of stabilizer material, and the uniformity, appearance and degree of surface perfection of said modified side being sub-

stantially unaffected by said modification wherein the degree of surface perfection is characterized by being substantially



non-tacky, non-streaky and having substantially its original shape and hardness.

4,978,577

METHOD FOR PREPARING LAMINATES OF ZNSE AND ZNS

Parul V. Purohit, Woburn; Jeffery L. Kirsch, Tewksbury, and James C. MacDonald, Stoneham, all of Mass., assignors to CVD Incorporated, Woburn, Mass.

Filed Apr. 12, 1989, Ser. No. 337,026
Int. Cl.[5] B32B *9/00*
U.S. Cl. 428—409 **10 Claims**

9. A method of improving the adherence of a chemical vapor deposited layer of ZnS to a ZnSe substrate which comprises, prior to depositing the ZnS onto the ZnSe, contacting the ZnSe with H_2S in the absence of zinc metal vapor at a temperature and for a time sufficient to cause the H_2S to react with the ZnSe.

4,978,578

OPTICAL DISK OF POLYCARBONATE

Tatsuya Kanno; Ikuo Takahashi; Kenichi Sasaki, all of Himeji; Yoshihiro Iguchi, Tatsuno, and Yutaka Fukuda, Himeji, all of Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Jul. 27, 1988, Ser. No. 225,052
The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.
Int. Cl.[5] B32B *27/36*; C08G *63/62*
U.S. Cl. 428—412 **7 Claims**

1. An optical disk which comprises a substrate of an aromatic polycarbonate obtained by polymerizing one or two monomers polymerized through carbonate linkages and a recording layer coated thereon, said recording layer being capable of having a signal recorded thereon by a laser beam and having a recorded signal read by reflection or transmission of a laser beam,

the monomer or monomers being selected from the group consisting of:

(a-1) 1,1′-bis-(4-hydroxyphenyl)-p-diisopropylbenzene
(a-2) 1,1′-bis-(4-hydroxyphenyl)-m-diisopropylbenzene,
(b-1) 2,2-bis-(4-hydroxyphenyl)propane,
(b-2) 2,2-bis-(4-hydroxyphenyl)butane,
(b-3) 2,2-bis-(4-hydroxyphenyl)-4-methylpentane,
(b-4) 2,2-bis-(4-hydroxyphenyl) octane,
(b-5) 1,1-bis-(4-hydroxyphenyl)cyclohexane,
(b-6) 4,4′-dihydroxy-2,2,2-triphenylethane,
(b-7) 2,2-bis-(4-hydroxy-3-methylphenyl)propane,
(b-8) 2,2-bis-(4-hydroxy-3-isopropylphenyl)propane,
(b-9) 2,2-bis-(4-hydroxy-3-sec.-butylphenyl)propane,
(b-10) 2,2-bis-(3,5-dimethyl-4-hydroxyphenyl)propane, the polycarbonate being selected from the group consisting of

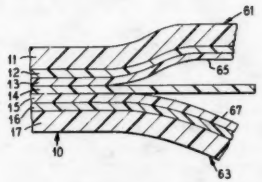
(I) a copolymer consisting of 3 to 97 mole percent of (a-1) and 97 to 3 mole percent of one of (b-1) to (b-10),
(II) a homopolymer of (a-1) and
(III) a copolymer consisting of 3 to 97 mole percent of (a-2) and 97 to 3 mole percent of one of (b-1), (b-5), (b-6), (b-10) and (a-1).

4,978,579

MULTI-LAYER FILM STRUCTURES FOR PROVIDING TWO WEBS OF FILM

Larry A. Rosenbaum, Gurnee, Ill., assignor to Baxter International Inc., Deerfield, Ill.

Filed May 11, 1989, Ser. No. 350,379
Int. Cl.[5] B32B *27/30, 27/32, 27/36*
U.S. Cl. 428—483 **44 Claims**



1. A film structure comprising:

a first layer of polyvinyl chloride;
a second layer of polyester;
a third layer of polyvinylidene chloride;.
a fourth layer of a material that does not adhere to a polyvinylidene chloride layer;
a fifth layer of polyvinylidene chloride;
a sixth layer of polyester; and
a seventh layer of polyvinyl chloride.

4,978,580

THERMAL TRANSFER RECORDING MEDIUM

Toshiaki Tezuka, and Takao Abe, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 61,334, Jun. 11, 1987, abandoned. This application Mar. 14, 1989, Ser. No. 324,982
Claims priority, application Japan, Jun. 24, 1986, 61-148635
Int. Cl.[5] B41M *5/26*
U.S. Cl. 428—484 **7 Claims**

1. A thermal transfer recording medium comprising a support and, provided thereon in order from the support, a heat-fusible layer containing a heat-fusible substance and a thermoplastic layer containing a thermoplastic resin, a coloring agent and cross-linking polymer selected from the group consisting of a copolymer of styrene and divinylbenzene, a copolymer of vinyl chloride and divinylbenzene, a copolymer of polypropylene and divinylbenzene, a copolymer obtained by copolymerization of a composition of vinyl acetate and a small amount of vinyl adipate added thereto and a polycondensation product of glycerol and phthalic acid, said cross-linking polymer being present in a quantity of 5 to 40% by weight with respect to the total solid components constituting said thermoplastic layer.

4,978,581
ANTI-SEISMIC BEARING

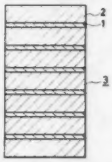
Yoshihide Fukahori, Hachioji; Hiromu Kojima, Higashimurayama, and Akihiko Ogino, Kodaira, all of Japan, assignors to Bridgestone Construction, Tokyo, Japan

Continuation-in-part of Ser. No. 7,302, Jan. 27, 1987, Pat. No. 4,830,927. This application Jul. 22, 1988, Ser. No. 223,189

Claims priority, application Japan, Jul. 27, 1987, 62-187288; Dec. 1, 1987, 62-303483

Int. Cl.[5] B32B *15/06*; E04B *1/98*; F16M *13/00*

U.S. Cl. 428—492 15 Claims



1. An anti-seismic bearing comprising a plurality of rigid plates and viscoelastic flexible plates laminated alternately, with at least one of said flexible plates being made of a vulcanizate of a high-loss rubber compound composed of 100 parts by weight of rubber and 3 to 40 parts by weight of phenolic resin having a softening point or melting point of 150° C. or below, said vulcanizate having the properties specified below;

(i) the hysteresis ratio at 100% tensile deformation at 25° C. is 0.2 to 0.7;

(ii) the ratio $E_{(-10)}/E_{(30)}$ is 1.0 to 2.5, where $E_{(-10)}$ is a storage modulus at −10° C. and $E_{(30)}$ is a storage modulus at 30° C., both dynamically measured at 5 Hz and 0.01% strain;

said high-loss rubber compound containing a tackifier defined in (iii) and/or (iv) below;

(iii) petroleum hydrocarbon resin in an amount of 2 to 40 parts by weight for 100 parts by weight of rubber,

(iv) rosin or rosin derivative in an amount of 2 to 20 part by weight for 100 parts by weight of rubber.

4,978,582
RESISTANCE-WELDABLE COMPOSITE

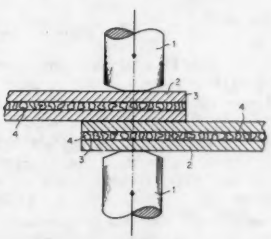
Klaus Stamm, and Ulrich Tenhaven, both of Dortmund, Fed. Rep. of Germany, assignors to Hoesch Stahl AG, Dortmund, Fed. Rep. of Germany

Filed Oct. 11, 1989, Ser. No. 419,770

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1988, 3834829

Int. Cl.[5] B22F *3/00*

U.S. Cl. 428—551 3 Claims



1. A resistance-weldable three-layer composite for attenuating vibrations comprising: two outer steel layers; a viscously elastic plastic core between said two outer layers' said plastic core having a thickness and being impact-resistant; said three-layer composite having a substantially low weight per unit area; said plastic core containing a uniformly distributed powdered ferrosilicon in an amount of at least 3% by volume, said ferrosilicon having a particle size ranging from 70% to 130 % of the thickness of said core; said ferrosilicon comprising further broken nonspherical material with particles of irregular shape.

4,978,583
PATTERNED METAL PLATE AND PRODUCTION THEREOF

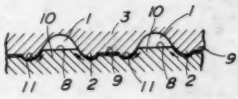
Tsuneyoshi Wakui; Takeo Ohnishi; Yuji Shimoyama; Hideo Kuguminato; Fumio Kosumi; Tadaaki Yasumi; Hironobu Ohno; Toshio Akizuki, and Fumiya Yanagishima, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Dec. 22, 1987, Ser. No. 136,729

Claims priority, application Japan, Dec. 25, 1986, 61-310601; Jul. 27, 1987, 62-187346

Int. Cl.[5] B21D *53/00*

U.S. Cl. 428—600 34 Claims



1. An uneven patterned metal plate having a surface, on which a visual decorative uneven pattern is formed by at least one pattern unit, said plate having a plurality of pattern units, said pattern units being separated from each other by unpatterned plane areas free of uneven patterns, each of said pattern units being constituted by and with a plurality of uneven dots, each of which has a size D, said uneven dots being arranged in a predetermined density to have a given ratio η of the occupied area versus the plane area in said pattern unit, said plane area having a surface roughness Ra which is equal to or less than 40 μm, said size D and area ratio η being in the range of:

$$10 \leq D \leq 300 \ (\mu m)$$

$$30\eta \leq 100 \ (\%)$$

and wherein the size of said pattern unit has a minimum axial length or width equal to or greater than 1 mm.

4,978,584
MAGNETO-OPTICAL STORAGE MEDIUM

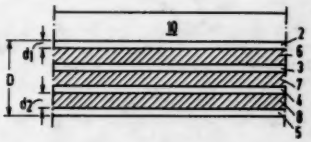
Wolfgang Reim, and Dieter Weller, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 5, 1989, Ser. No. 348,275

Claims priority, application Fed. Rep. of Germany, May 9, 1988, 3815848

Int. Cl.[5] H01F *10/12*

U.S. Cl. 428—611 20 Claims



1. Magneto-optical storage medium of several layers with different magnetic properties, comprising:

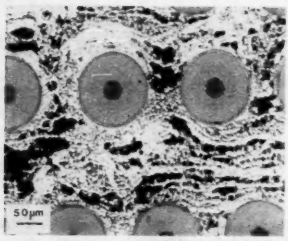
at least one magnetic layer of a magnetic storage material;
at least one reflector layer with an index of refraction, n, less than one; wherein the thickness of the reflector layer is at least as large as the thickness of the magnetic layer, and the maximum thickness of the magnetic layer equals 1/K, where K is the absorption coefficient of the magnetic layer, and wherein the reflector layer is selected from the group consisting of silver, Ag; thulium sulfide, Tms; titanium nitride, TiN; zirconium nitride, ZrN; hafnium nitride, HfN; gold, Au.

4,978,585

SILICON CARBIDE FIBER-REINFORCED TITANIUM BASE COMPOSITES OF IMPROVED TENSILE PROPERTIES

Ann M. Ritter, Schenectady; Paul A. Siemers, Clifton Park, both of N.Y., and Donald R. Spriggs, San Diego, Calif., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 2, 1990, Ser. No. 459,894
Int. Cl.[5] B05D *1/10*; B32B *15/14*; C22C *32/00*; B22D *23/00*
U.S. Cl. 428—614 **7 Claims**



1. A method for forming a reinforced composite member which comprises
providing a set of reinforcement strands,
mounting said strands on a substrate to receive a plasma-sprayed matrix,
providing a powdered sample of Ti-1421 alloy,
plasma-spray depositing said powder onto said strands and onto said substrate with an RF plasma gun to form a matrix of Ti-1421 alloy, and
modifying the aluminum concentration of said Ti-1421 alloy as it is being plasma-spray deposited by increasing the superheat of the particles of said alloy as the particles traverse the plume of said RF plasma thereby increasing the amount of beta crystal phase in the deposited matrix.

6. As an article of manufacture,
a fiber reinforced metal monotape which comprises,
a plurality of silicon carbide filaments,
said filaments having disposed thereabout a plasma spray deposited Ti-1421 alloy, and
said alloy displaying a higher percentage of beta crystal form than normal plasma spray deposited Ti-1421 such that there are larger semicontinuous regions of the beta-phase or transformed beta-phase in the matrix.

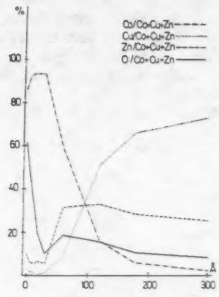
4,978,586

STEEL SUBSTRATE WITH METAL COATINGS FOR THE REINFORCEMENT OF VULCANIZABLE ELASTOMERS

Daniël Chambaere, Copley, Ohio; Wilfred Coppens, Kortrijk-Marke, Belgium; Hugo Lievens, Gent, Belgium; Roger De Gryse, Oosterzele, Belgium; Robert Hoogewijs, De Pinte, Belgium; Joost Vennik, Aalter, Belgium, and Lucien Fiermans, Gent, Belgium, assignors to N. V. Bekaert S.A., Zwevegem, Belgium

Filed Oct. 14, 1988, Ser. No. 257,562
Claims priority, application Belgium, Oct. 22, 1987, 8701204
Int. Cl.[5] B32B *15/06*
U.S. Cl. 428—625 **15 Claims**

1. A steel substrate for the reinforcement of elastomers, said steel substrate having first and second metal coating layers, wherein the second layer covers at least a part of the first layer, and wherein a bonding layer is present between the first and



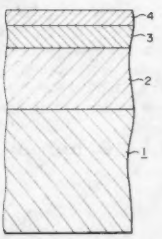
second layers and comprises at least one nonmetallic component, said bonding layer having a weight of 20 to 55 mg per m^2 of surface of said first layer.

4,978,587

MULTILAYER SLIDING MATERIAL

Sanae Mori; Masaaki Sakamoto, both of Nagoya; Motomu Wada, Owariasahi, and Hideo Ishikawa, Komaki, all of Japan, assignors to Daido Metal Company Ltd., Nagoya, Japan

Filed Jun. 13, 1989, Ser. No. 365,404
Int. Cl.[5] B32B *15/01*
U.S. Cl. 428—645 **9 Claims**



1. A multilayer sliding material comprising a steel backing layer, a bearing layer of copper-based alloy bonded to the steel backing layer which bearing layer has a thickness of 0.15 to 0.5 mm, a silver or silver alloy plating layer bonded to the bearing layer which plating layer has a thickness of more than 3 µm but not more than 50 µm, and a surface layer of lead-based alloy bonded to the silver or silver alloy plating layer.

6. A multilayer sliding material used for a larger engine, comprising a steel backing layer, a bearing layer of copper-based alloy bonded to the steel backing layer which bearing layer has a thickness of more than 0.5 mm, a silver or silver alloy plating layer bonded to the bearing layer which plating layer has a thickness of more than 3 µm, and a surface layer of lead-based alloy bonded to the silver or silver alloy plating layer.

4,978,588

PLATED STEEL SHEET FOR A CAN

Takeshi Adaniya; Yoshinori Yomura; Naoyuki Ooniwa; Yoshihiko Yasue; Hiroshi Kagechika; Tadahiko Mishima, and Hiroshi Ishikawa, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Division of Ser. No. 245,754, Sep. 16, 1988. This application Apr. 25, 1990, Ser. No. 514,419

Claims priority, application Japan, Sep. 18, 1987, 62-233975

Int. Cl.[5] B32B *15/10;* C23C *16/00;* B65D *90/04*

U.S. Cl. 204—192.31 4 Claims

4. A method for producing a coated steel sheet for a can comprising:

plating a Ti alloy film 0.005 to 5 μm thick on one surface of the steel sheet by means of a dry process; and

plating a metal film 0.005 to 5 μm thick on the other surface of the steel sheet by means of a dry process, said plated metal film comprising a metal selected from the group consisting of Al, Ti, Zn, Ni, Co, Cr, Mo and Sn.

4,978,589

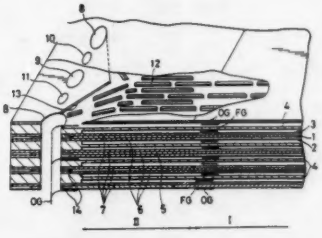
FUEL CELL

Shoji Shiozawa, Yokohama, and Toru Shimizu, Urawa, both of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,919

Int. Cl.[5] H01M *8/04*

U.S. Cl. 429—26 8 Claims



1. A fuel cell comprising a plurality of fuel cell elements stacked via separator plates, each cell element comprising an electrolyte plate, cathode and an anode, the electrolyte plate being sandwiched by the cathode and the anode, oxidizing gas and fuel gas being supplied to each cell element in the same direction in one cell element but in the direction opposite the gas flow of an adjacent cell element, passages for the oxidizing gas and the fuel gas being formed by projections provided on both faces of the separator plate, and the stack of the cathode and the anode defining a power generation part of the fuel cell, characterized in that preheating devices are proivded as a part of the fuel cell next to the power generation part in the direction of said gases flow, in a manner such that both incoming and outgoing gases pass thrugh the preheating devices and said preheating deivce comprises heat exchange promoting elements provided on both faces of the separator plate, such that the heat is transferred from the outgoing gases to the incoming gases.

4,978,590

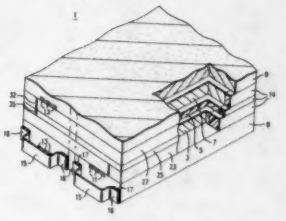
DRY COMPLIANT SEAL FOR PHOSPHORIC ACID FUEL CELL

Samuel J. Granata, Jr., South Greensburg, and Boyd M. Woodle, N. Huntingdon Township, Westmoreland County, both of Pa., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Sep. 11, 1989, Ser. No. 405,716

Int. Cl.[5] H01M *2/08*

U.S. Cl. 429—35 22 Claims



1. A dry seal for a fuel cell having an anode assembly, a cathode assembly, and a matrix assembly disposed between two conductive plates, said dry seal comprising a first generally impermeable seal strip encircling one of the anode and cathode assemblies; a second generally impermeable seal strip encircling the other of the anode and cathode assemblies; said first seal strip being wider than the second seal strip; a compliant seal strip bonded to one of said seal strips; said seal strips being generally sized to fit the perimeter of the conductive plates; and being disposed between said conductive plates to form a dry seal adjacent the margins to keep electrolyte from the peripheral edges of the fuel cell and to provide smooth exterior sealing surfaces.

4,978,591

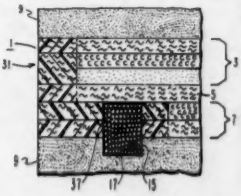
CORROSION FREE PHOSPHORIC ACID FUEL CELL

Maynard K. Wright, Bethel Park, Pa., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 11, 1989, Ser. No. 405,718

Int. Cl.[5] H01M *2/08*

U.S. Cl. 429—35 5 Claims



1. A phosphoric acid fuel cell comprising an anode assembly with a catalytic anode layer, a cathode assembly with a catalytic cathode layer, and a matrix disposed therebetween forming the cell elements, which are disposed between a pair of conductive plates that have a plurality of grooves for supplying fuel gas to the anode assembly and an oxidant to the cathode assembly, the catalytic anode layer being larger than the catalytic cathode layer and the portion of the conductive plate adjacent the cathode assembly having electrolyte grooves disposed therein with a wick disposed in each electrolyte groove to supply electrolyte to the matrix, which transports electrolyte to catalytic layer of the anode and cathode assemblies, the size of the catalytic layers and the disposition of the

electrolyte grooves cooperating to eliminate corrosion of the cathode layers and the adjacent conductive plate.

4,978,592

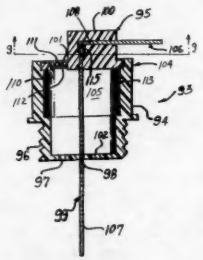
UNIVERSAL ELECTROLYTE LEVEL INDICATOR FOR WET CELL BATTERIES

Donald P. Dattilo, 2302 Taylorsville Rd., Louisville, Ky. 40205

Continuation-in-part of Ser. No. 246,746, Sep. 20, 1988, Pat. No. 4,913,987. This application Mar. 28, 1990, Ser. No. 501,902

Int. Cl.[5] H01M 2/12, 2/48

U.S. Cl. 429—89 **13 Claims**



1. A battery cap sensor probe comprising a generally hollow body having an interior chamber, means for connecting said body to a battery cell opening, means for placing said interior chamber in fluid communication with a battery cell interior, means for placing said interior chamber in fluid communication with atmosphere whereby said last-mentioned two means allow battery cell gases to escape to atmosphere, a conductive probe carried by said body, said conductive probe being comprised of a probe portion accessible from the exterior of said body and being adapted for immersion into the electrolyte of a battery cell, said conductive probe further including a terminal portion accessible from the exterior of said body and being adapted for electrical connection to an electrical circuit, and means for connecting said probe portion and said terminal portion to each other.

4,978,593

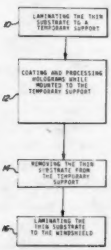
HOLOGRAM TRANSFER PROCESS

Khin S. Yin, Alhambra; Michael J. Virgadamo, Pasadena; David D. Tanaka, Downey, and Angel F. Banuelos, Oxnard, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 25, 1989, Ser. No. 411,760

Int. Cl.[5] G03C 11/12

U.S. Cl. 430—2 **15 Claims**


LAMINATING THE THIN SUBSTRATE TO A TEMPORARY SUPPORT
COATING AND PROCESSING HOLOGRAMS WHILE MOUNTED TO THE TEMPORARY SUPPORT
REMOVING THE THIN SUBSTRATE FROM THE TEMPORARY SUPPORT
LAMINATING THE THIN SUBSTRATE TO THE WINDSHIELD

1. A method for making a hologram comprising:

(a) mounting a first side of a thin substrate to a temporary thicker support which includes:

(i) applying adhesive between the first side of said thin substrate and said temporary support, and

(ii) exposing said thin substrate to ultraviolet radiation until said adhesive has cured;

(b) coating a second side of said thin substrate with a photosensitive material;

(c) exposing said photosensitive material to produce a hologram therein;

(d) developing the hologram while on the temporary support;

(e) removing said thin substrate from said temporary substrate; and

(f) laminating said thin substrate to a final surface with the second side down.

4,978,594

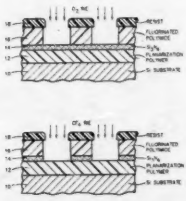
FLUORINE-CONTAINING BASE LAYER FOR MULTI-LAYER RESIST PROCESSES

James A. Bruce, Essex Junction; Michael L. Kerbaugh, Burlington, both of Vt.; Ranee W. Kwong, Wappinger Falls; Tanya N. Lee, Underhill, both of N.Y.; Harold G. Linde, Richmond, Vt., and Harbans S. Sachdev, Wappinger Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,530

Int. Cl.[5] G03F 7/26

U.S. Cl. 430—14 **13 Claims**



1. A structure suitable for deposition of a metallization pattern thereon, said structure having been formed by:

depositing a layer of polymeric material onto a substrate, said polymeric material having a fluorine-containing functional group and curing said polymeric material;

applying a layer of photoresist material over said polymeric material;

imagewise exposing and developing said photoresist material to imagewise expose said underlying polymeric material;

silylating the photoresist material remaining on the polymeric material; and

reactive ion etching the underlying exposed polymeric material to transfer a pattern down to the underlying substrate utilizing the silylated resist material as an etch barrier to thereby provide a surface pattern on said substrate free of silicon embedded therein, and essentially free of any cracking in the underlying polymer layer; and

wherein the structure includes a layer of photoresist material having a silicon moiety dispersed therein.

4,978,595

PHOTOCONDUCTIVE TONER CONTAINING POLYMERIC-MAGNETIC COORDINATION COMPLEX

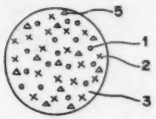
Masahiro Anno; Junji Machida; Junji Ohtani; Eiichi Sano, and Fumio Masuda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 278,748, Dec. 2, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,724

Claims priority, application Japan, Dec. 3, 1987, 62-308007

Int. Cl.[5] G03G *9/08*

U.S. Cl. 430—106.6 4 Claims



1. A photoconductive toner comprising at least a thermoplastic resin, a photoconductive material and a polymeric-magnetic coordination complex.

4,978,596

ELECTROPHOTOGRAPHIC TONER COMPRISING LACTONE-MODIFIED EPOXY RESIN

Ryuichi Shimizu, Hitachiota; Tsuneaki Kawanishi, Hitachi; Shigeo Suzuki, Hitachi; Shigeo Hosaka, Hitachi; Yasuki Mori, Hitachi, and Toshikazu Narahara, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 17, 1986, Ser. No. 840,198

Claims priority, application Japan, Mar. 25, 1985, 60-58478; Mar. 29, 1985, 60-63649

Int. Cl.[5] G03G *9/00*

U.S. Cl. 430—109 6 Claims

1. A non-magnetic electrophotographic toner which comprises a binder resin, and a coloring agent, the binder resin containing a thermoplastic lactone-modified epoxy resin having a lactone content of 3 to 90% by weight, obtained by subjecting all or a portion of secondary hydroxyl groups of epoxy compounds having hydroxyl groups in the molecules to ring opening polymerization of ϵ-caprolactone.

4,978,597

IMAGE FORMING METHOD AND IMAGE FORMING APPARATUS UTILIZING A TONER-CARRYING MEMBER WITH SPHERICAL CONCAVITIES

Toshiaki Nakahara, Tokyo, and Hirohide Tanikawa, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 316,802

Claims priority, application Japan, Feb. 29, 1988, 63-046882

Int. Cl.[5] G03G *15/08*

U.S. Cl. 430—122 45 Claims

23. An image forming method, comprising:

deposing an electrostatic image-bearing member for holding an electrostatic charge image and a toner-carrying member for carrying a magnetic toner with a prescribed gap therebetween at a developing station, wherein the surface of the toner-carrying member has an unevenness comprising sphere-traced concavities formed by blasting with particles with a definite spherical shape and has a surface roughness d of 0.1 to 5 microns;

the magnetic toner comprises 17–60% by number of particles of 5 microns or smaller, 1–23% by number of particles of 8–12.7 microns, and 2.0% by volume or less of particles of 16 microns or larger and has a volume-average particle size of 4–11 microns;

conveying the magnetic toner in a layer regulated in a thickness thinner than the prescribed gap to the developing station; and applying an alternating electric field to the toner-carrying member at the developing station to effect development with the magnetic toner.

4,978,598

PROCESS FOR PRODUCING A LIQUID ELECTROPHOTOGRAPHIC TONER

Mohamed A. Elmasry, Woodbury, and Kevin M. Kidnie, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 279,438, Dec. 2, 1988, Pat. No. 4,925,766. This application Mar. 8, 1990, Ser. No. 490,344

Int. Cl.[5] G03G *9/13, 9/135*

U.S. Cl. 430—137 4 Claims

1. A method of making a liquid toner comprising the steps of

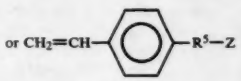
A. preparing a comonomeric stabilizer precursor by azobisisobutyronitrile catalyzed polymerization of three ethylenically unsaturated monomers, one selected from each of groups I, II, and III, said group I is an alkenylazlactone, a glycidylmethacrylate, methacrylic acid, or allylmethacrylate, said group II is octadecyl methacrylate, lauryl methacrylate, 2-ethylhexylacrylate, poly(12-hydroxystearic acid), or a monomer of 0.5–0.6 mole % methacryloxypropylmethyl polydimethylsiloxane which is trimethylsiloxy terminated,

and said group III is

$CH_2{=}CH(R){-}R^5{-}Z$

$CH_2{=}CH(R)COO{-}R^5{-}Z$

$CH_2{=}CH(R)CO{-}N(R^4){-}R^5{-}Z$



where R,R^4 is H or CH_3,

R^5 is a single bond or a divalent linking group, and Z is a bidentate or polydentate chelating group,

B. carrying out reactions on said group I comonomer selected from

(i) condensing said azlactone moiety with an ethylenically unsaturated nucleophile selected from the group consisting of a reactive group selected from the group consisting of hydroxyl, amino, and mercaptan,

(ii) condensing said glycidyl moiety with a reactant selected from the group consisting of acrylic acid and methacrylic acid,

(iii) condensing said acrylic acid moiety with γ-glycidylmethacrylate,

(iv) carrying out no reaction with moiety derived from said allylmethacylate,

C. preparing a latex by copolymerizing stabilizer precursor from step B in an aliphatic hydrocarbon solvent with a comonomer selected from the group consisting of ethylacrylate, methylacrylate, and vinylacetate,

D. adding the latex of step C to a hot solution in said aliphatic hydrocarbon of a metal soap selected from the group consisting of the salts of a fatty acids with a metal selected from the group consisting of Al, Ca, Co, Cr, Fe, Zn, and Zr.

E. dispersing a colorant in the latex of step D,

said step B(i) being accomplished with catalysts selected from the group consisting of

(a) for said chelating group Z containing no nitrogen,
dodecylbenzene sulfonic acid
stearyl acid phosphate
methane sulfonic acid
any p-toluene sulfonic acid

(b) for said chelating group Z containing nitrogen,
stearyl acid phosphate
dibutyl tin oxide
said step B(ii) being accomplished with a catalyst selected from the group consisting of
dibutyl tin oxide
stearyl acid phosphate
a calcium soap,
2-ethylhexanoate

a chromium soap
triphenylphosphine
triphenylantimony
dodecylbenzene sulfonic acid (with a chelate not containing nitrogen)

said step B(iii) being accomplished with a dibutyl tin oxide catalyst.

4,978,599

COMBINATION OF PHOTOSENSITIVE ELEMENTS FOR USE IN RADIOGRAPHY

Sergio Pesce, Savona, Italy, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 11, 1989, Ser. No. 378,585
Claims priority, application Italy, Jul. 14, 1988, 21361 A/88
Int. Cl.[5] G03C *1/84, 1/92*
U.S. Cl. 430—139 **28 Claims**

1. A combination of photosensitive elements for use in radiography comprising two separate front and back X-ray fluorescent screens and a silver halide radiographic element comprising a transparent polymeric support base front and back silver halide emulsion layers each coated on one surface of said support, wherein said front screen is arranged adjacent to said front silver halide layer and said back screen is arranged adjacent to said back silver halide layer, and wherein

(1) said front screen comprises a first radiation emitting phosphor and said front silver halide layer comprises silver halide grains sensitive to said first radiation emitted by said front screen, and

(2) said back screen comprises a second radiation emitting phosphor and said back silver halide layer comprises silver halide grains sensitive to said second radiation emitted by said back screen,

characterized in that

(a) said first radiation emitted by said front screen is in a wavelength region of non-actinic radiation and said second radiation emitted by said back screen is in a wavelength region of actinic radiation,

(b) said first radiation emitted by said front screen has a wavelength which differs from said second radiation emitted by said back screen by at least 50 nm,

(c) said front silver halide emulsion layer is substantially insensitive to said second radiation emitted by said back screen, and

(d) said back silver halide emulsion layer is substantially insensitive to said first radiation emitted by said front screen,

the difference in wavelength region of said first and second radiations and the insensitivity of each silver halide layer to radiation emitted by opposite screen being such to reduce crossover exposure of at least 10 percent when compared with a symmetrical combination of a pair of green light emitting fluorescent screens and a double coated green sensitized silver halide radiographic element.

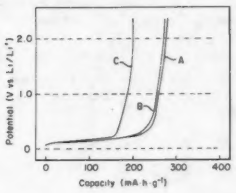
4,978,600

ELECTRODE AND A METHOD FOR THE PRODUCTION OF THE SAME

Tomonari Suzuki, Kashihara; Hiroshi Wada, Nara; Yoshikazu Yoshimoto, Tenri; Masaru Yoshida, and Shigeo Nakajima, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 7, 1989, Ser. No. 362,505
Claims priority, application Japan, Jun. 8, 1988, 63-141374
Int. Cl.[5] H01M *4/58*
U.S. Cl. 429—218 **12 Claims**

1. In an electrode comprising a graphite composition as an active material, the improvement including that said graphite composition is a mixture of high-crystalline graphite having interlayer spacings in the range of 0.3354 to 0.3400 nm and



low-crystalline graphite having interlayer spacings in the range of 0.343 to 0.355 nm.

4,978,601

LEAD ALLOY BATTERY GRIDS BY LASER TREATMENT

Michael M. Kim, Raleigh, and Dodd S. Carr, Durham, both of N.C., assignors to International Lead Zinc Research Organization, Inc., Research Triangle Park, N.C.

Filed Oct. 30, 1989, Ser. No. 428,617
Int. Cl.[5] H01M *4/73*
U.S. Cl. 429—245 **33 Claims**

1. A method of improving the surface characteristics of a lead-containing battery grid material, comprising directing a beam of laser light onto said surface so as to cause rapid melting of discrete regions of the surface exposed to said light, and thereafter ceasing to expose said region to said laser beam so as to cause rapid cooling and solidification of said region.

4,978,602

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL IMPROVED ON PINHOLE PRODUCTION

Akio Fujita, and Takeshi Habu, both of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 5, 1989, Ser. No. 417,745
Claims priority, application Japan, Oct. 14, 1988, 63-258848
Int. Cl.[5] G03C *1/06*
U.S. Cl. 430—264 **18 Claims**

1. A silver halide photographic light-sensitive material comprising a support having thereon

a silver halide emulsion layer containing a silver halide emulsion and a hydrazine compound or a tetrazolium compound,

a layer being provided on the surface of said emulsion layer farther from said support and containing a compound having a maximum spectral absorption at a wavelength of at least 50 nm longer than that of the maximum spectral sensitivity of said silver halide emulsion, and

a layer being interposed between said support and said emulsion layer containing a macromolecular compound synthesized from ethylenically unsaturated monomers having a heterocyclic group with a sulfo group or an alkylsulfo group as a substituent; said heterocyclic group being a pyridyl group, a pyrrodyl group, a carbazolyl group, a pyrrolyl group, a thienyl group, a furyl group or an indolyl group.

4,978,603

IMAGE FORMING PROCESS COMPRISING DEVELOPING FINE GRAIN SILVER HALIDE EMULSION WITH A HYDROQUINONE DEVELOPER

Nobuaki Inoue; Morio Yagihara, and Yoshihiro Takagi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 14, 1988, Ser. No. 284,080

Claims priority, application Japan, Dec. 14, 1987, 62-315768; Dec. 18, 1987, 62-320705

Int. Cl.[5] G03C 5/24, 1/54

U.S. Cl. 430—265 14 Claims

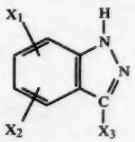
1. An image-forming process which comprises developing an imagewise exposed silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer composed of silver halide grains comprising more than 90 mol % silver chloride and containing at least 1×10^{-6} mol of a rhodium salt per mol of silver and having a mean grain size of not larger than 0.15 μm with a developer meeting the following conditions (a) to (d);

(a) the developer substantially contains only a dihydroxybenzene as the developing agent,

(b) the developer contains at least 0.18 mol/liter of free sulfite;

(c) the pH of the developer is at least 10.5, and

(d) the developer contains at least 20 mg/liter of a compound represented by formula (I):



wherein X_1 represents a hydrogen atom or a nitro group and X_2 and X_3 each represents a hydrogen atom or an alkyl group having from 1 to 4 carbon atoms.

4,978,604

PROCESS FOR FORMING IMAGES

Christopher P. Banks, Saffron Walden, and Edward Irving, Burwell, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 20, 1988, Ser. No. 208,524

Claims priority, application United Kingdom, Jul. 1, 1987, 8715435

Int. Cl.[5] G03C 5/16

U.S. Cl. 430—327 12 Claims

1. A process for the formation of an image which comprises

(i) applying to a substrate a layer of a liquid composition which comprises

(A) a polymerizable material having, on average, more than one polymerizable acrylic group per molecule,

(B) a first radiation-activated polymerization initiator for (A) and

(C) a second radiation-activated polymerization initiator for (A), the initiator (B) being activatable by radiation of longer wavelength than that of radiation by which (C) is activatable,

with the proviso that when (B) or (C) is an aromatic onium salt, the composition is substantially free from polymerizable epoxide or vinyl ether groups,

(ii) subjecting the composition to radiation having a wavelength at which one of (B) and (C) is activated but the other is not substantially activated, thereby polymerizing (A) such that the layer of liquid composition is solidified but remains curable,

(iii) subjecting the solidified layer in a predetermined pattern to radiation having a wavelength at which the initiator not activated in stage (ii) is activated, such that in exposed areas the solidified layer is substantially cured, and

(iv) removing areas of the solidified layer that have not been substantially cured.

4,978,605

BENZOYLACETANILIDE PHOTOGRAPHIC YELLOW DYE IMAGE-FORMING COUPLERS AND PHOTOGRAPHIC ELEMENTS CONTAINING THEM

Siu C. Tsoi, Watford, United Kingdom, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 6, 1989, Ser. No. 295,081

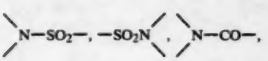
Claims priority, application United Kingdom, Feb. 1, 1988, 8802129

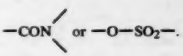
Int. Cl.[5] G03C 7/36

U.S. Cl. 430—557 11 Claims

1. A photographic element comprising a support bearing at least one photographic silver halide emulsion layer and having associated therewith at least one non-diffusible, yellow dye image-forming benzoylacetanilide coupler having an aryloxy coupling-off group wherein (a) the benzene ring of the benzoyl group of the coupler comprises a substituent R^1O— wherein R^1 is an alicyclic, or aliphatic, unsubstituted or substituted, branched or unbranched hydrocarbon group; and, (b) the benzene ring of the acetanilide group comprises a substituent attached directly thereto via a linking group L of the formula

(I) —O—CO, —CO—O—, —O—, —S—, —SO_2—,





wherein the substituent comprises an unsubstituted branched alkyl group containing at least 4 carbon atoms.

4,978,606

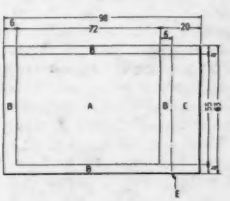
COLOR PHOTOGRAPHIC MATERIAL WITH WATER INSOLUBLE AMIDO BOND POLYMER

Nobutaka Ohki; Keiji Mihayashi; Shigeru Nakamura, and Hiroshi Fukuzawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

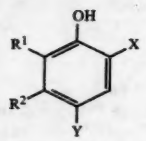
Filed Dec. 12, 1988, Ser. No. 283,097

Int. Cl.[5] G03C 5/54, 1/42, 7/26

U.S. Cl. 430—505 16 Claims

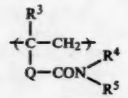


1. A silver halide color photographic material comprising a support having thereon at least one light-sensitive silver halide emulsion layer, at least one layer of the material containing the combination of a water-insoluble homopolymer or copolymer which has an amido bond in the repeating unit and at least one compound represented by the formula (I):



(I)

wherein X represents an alkyl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an amido group or a sulfonamido group; R^1 and R^2, which may be the same or different, each represents an alkyl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an amido group, a sulfonamido group, hydrogen, a halogen atom, a sulfo group, a carboxyl group, a carbamoyl group, a sulfamoyl group, an acyl group or a sulfonyl group, provided that R^1 and R^2 may be linked to form a carbocyclic ring; and Y represents a hydroxyl group or a sulfonamido group wherein the water-insoluble homopolymer or copolymer is represented by the formula (II):



(II)

wherein R^3 represents hydrogen or an alkyl group; Q represents a single bond; R^4 and R^5, which may be the same or different, each represents hydrogen or an alkyl group; and R^4 and R^5 maybe linked to form a heterocyclic ring.

11. The silver halide color photographic material as claimed in claim **1**, comprising at least one silver halide emulsion layer sensitive to red light; at least one silver halide emulsion layer sensitive to blue light; at least one silver halide emulsion layer sensitive to green light; and at least one intermediate layer between said light-sensitive layers comprising a dispersion of the combination of a water-insoluble homopolymer or copolymer which has an amido bond in the repeating unit and at least one compound represented by formula (I).

4,978,607

PHOTOGRAPHIC RECORDING MATERIAL

Edouard Roche, Lohmar-Breidt; Wolfgang Himmelmann, Leverkusen; Hans-Theo Buschmann, Cologne, and Heinz Quambusch, Leverkusen, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

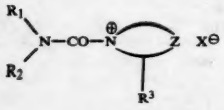
Filed Sep. 1, 1988, Ser. No. 239,392

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730319

Int. Cl.[5] G03C *1/30*

U.S. Cl. 430—642 **2 Claims**

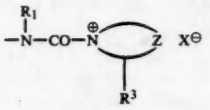
1. A photographic recording material comprising at least one gelatin-containing silver halide emulsion layer and at least one protective layer containing a gelatin derivative, the protective layer being further away from the layer support than each silver halide emulsion layer, characterized in that 60 to 85% of the amino groups of the gelatin in the gelatin derivative are reacted with a monofunctional acid derivative and the photographic recording material is hardened with a hardener corresponding to the following formula



in which

R_1 is alkyl, aryl or aralkyl,

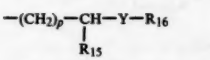
R_2 has the same meaning as R_1 or is alkylene, arylene, aralkylene or alkaralkylene, the second bond being attached to a group corresponding to the following formula



or

R_1 and R_2 together represent the atoms required to complete a piperidine, piperazine or morpholine ring, the ring optionally being substituted by C_1–C_3 alkyl or halogen,

R_3 represents hydrogen, alkyl, aryl, alkoxy —NR_4–COR_5, —$(CH_2)_m$—NR_8R_9, —$(CH_2)_n$—$CONR_{13}R_{14}$ or



or is a bridge member or a direct bond to a polymer chain,

R_4, R_6, R_7, R_9, R_{14}, R_{15}, R_{17}, R_{18} and R_{19} being hydrogen or C_1–C_4 alkyl,

R_5 being hydrogen, C_1–C_4 alkyl or NR_6R_7,

R_8 being —COR_{10},

R_{10} being $NRIIR_{12}$,

R_{11} being C_1–C_4 alkyl or aryl,

R_{12} being hydrogen, C_1–C_4 alkyl or aryl,

R_{13} being hydrogen, C_1–C_4 alkyl or aryl,

R_{16} being hydrogen, C_1–C_4 alkyl, COR_{18} or $CONHR_{19}$,

m being a number of 1 to 3,

n being a number of 0 to 3,

p being a number of 2 to 3 and

Y being 0 or NR_{17}, or

R_{13} and R_{14} together representing the atoms required to complete a piperidine, piperazine or morpholine ring, the ring optionally being substituted by C_1–C_3 alkyl or halogen,

Z representing the carbon atoms required to complete a 5- or 6-membered aromatic heterocyclic ring, optionally with a linked benzene ring, and

$X^{\ominus}$ is an anion which may be attached to the rest of the molecule by a covalent bond.

4,978,608

DNA DETECTION SYSTEM

Viola T. Kung, Menlo Park, and Peter A. Nagainis, San Jose, both of Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.

Filed Sep. 4, 1987, Ser. No. 93,361

Int. Cl.[5] G01N *33/53, 33/00, 33/566;* **C12Q** *1/68*

U.S. Cl. 435—6 **27 Claims**

1. A method for quantitatively detecting DNA in a sample wherein any DNA to be detected is labelled with a detectable label, said method comprising:

contacting a solid support with a high affinity single-stranded DNA binding protein (BP) to form immobilized BP;

contacting any single-stranded DNA in said sample with said immobilized BP to form DNA-BP complexes;

detecting any DNA-BP complexes by means of said label wherein any DNA-BP complexes detected are indicative of the presence of DNA in said sample.

4,978,609

MONOCLONAL ANTIBODY SPECIFIC TO HUMAN PANCREATIC PHOSPHOLIPASE A_2

Atsushi Misaki; Masao Kono; Michio Ogawa, all of Osaka, and Mitsuhiro Okamoto, Nara, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Mar. 25, 1988, Ser. No. 173,536
Claims priority, application Japan, Apr. 15, 1987, 62-93586
Int. Cl.[5] C01N *33/053*; C12N *5/00*
U.S. Cl. 435—7 10 Claims

1. A monoclonal antibody specific to human pancreatic phospholipase A_2 having an affinity constant greater than 10^{11} M^{-1}.

4,978,610

METHOD OF ASSAY EMPLOYING A MAGNETIC ELECTRODE

Gordon C. Forrest, Braemore, High Park Avenue, East Horsley, Surrey KT24 5DP; Simon J. Rattle, 52 Mabel Street, Woking, Surrey GU21, 1 NW; Grenville A. Robinson, 23 Burnham Way, Ealing, London, W13 9YE, and Hugh A. O. Hill, 9 Clover Close, Oxford, all of England

Continuation of Ser. No. 753,155, Jul. 9, 1985, abandoned. This application Jul. 23, 1987, Ser. No. 76,265
Claims priority, application United Kingdom, Jul. 10, 1984, 8417538; Jan. 25, 1985, 8501925; Apr. 4, 1985, 8508861
Int. Cl.[5] C12Q *1/25*; G01N *33/53*
U.S. Cl. 435—7 14 Claims

1. A method of effecting an electrochemical specific-binding assay of a ligand, either qualitatively or quantitatively, in an apparatus comprising at least one electrode, in which method a labelled component of the assay medium is, at least in part, magnetically held in the vicinity of the electrode.

4,978,611

REAGENTS FOR MEASUREMENT OF IMMUNE COMPLEXES AND METHOD FOR MEASUREMENT OF IMMUNE COMPLEXES BY USE THEREOF

Kenji Hosoda, Kawagoe; Hideaki Suzuki, Koganei; Takaharu Kubota, Hino, and Kiyoshi Nawata, Hachioji, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Sep. 20, 1985, Ser. No. 778,097
Claims priority, application Japan, Sep. 21, 1984, 59-196523
Int. Cl.[5] G01N *33/535, 33/564, 33/563*
U.S. Cl. 435—7 9 Claims

1. A reagent for measuring immune complexes which are fixed with an anti-C3 antibody-Facb gragment, said reagent consisting of said anti-C3 antibody-Facb fragment fixed to a carrier.

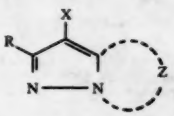
4,978,612

ANALYTICAL ELEMENT FOR DETERMINATION OF HYDROGEN PEROXIDE AND ANALYTICAL METHOD USING THE SAME

Morio Kobayashi, and Masakazu Sugao, both of Tokyo, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 5, 1987, Ser. No. 117,799
Claims priority, application Japan, Nov. 17, 1986, 61-273433
Int. Cl.[5] C12Q *1/61, 1/28, 1/26, 1/54*
U.S. Cl. 435—10 18 Claims

1. In an analytical method for determination, in a test solution, of hydrogen peroxide or a substance capable of being oxidized to form hydrogen peroxide, wherein the substance is reacted to form hydrogen peroxide, the hydrogen peroxide is subjected to a reaction sequence to form a measurable dye in an amount corresponding to the amount of hydrogen peroxide, and the amount of dye is measured and compared with a calibrated standard, the improvement comprising forming a measurable dye by applying the test solution to an analytical element comprising at least one reagent layer containing a reagent having peroxidative activity a compound represented by Formula (I) shown below, and an aromatic primary amine compound, or a salt thereof, capable of forming the measurable dye through the coupling reaction with the compound represented by Formula (I) shown below:



Formula (I)

wherein Z represents a group of nonmetallic atoms including at least one nitrogen necessary for forming a nitrogen-containing heterocyclic ring, which ring formed by Z may have a substituent; X represents a hydrogen atom or a group capable of being split off through the reaction with an oxidized product of the aromatic primary amine compound; and R represents a hydrogen atom or a substituent.

4,978,613

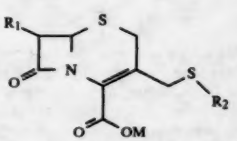
BETA-LACTAMASE ASSAY EMPLOYING CHROMOGENIC PRECIPITATING SUBSTRATES

Christopher Bieniarz, Highland Park; Michael J. Cornwell, and Douglas F. Young, both of Lake Villa, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Jan. 17, 1989, Ser. No. 298,098
Int. Cl.[5] C12Q *1/34*
U.S. Cl. 435—18 23 Claims

1. A method for detecting β-lactamases in a sample, comprising:

(a) exposing said sample to a β-lactamase substrate of formula I:

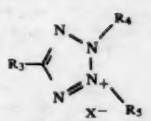


I

wherein R_1 is a group which maintains the ability of said substrate to be recognized as a substrate by β-lactamases and cleave the β-lactam ring; and

R_2, together with the sulfur atom to which it is attached, form a leaving group which is released into solution, the conjugate acid of which has a pKa in water of less than 8, and M is hydrogen or a group I metal;

(b) exposing said leaving group to a tetrazolium salt of formula II:



II

wherein R_3, R_4 and R_5 are independently selected from groups such that the redox potential of the resulting tetrazolium salt is 0 or lower volts; and

X is an anion; whereby a colored precipitate is formed in the presence of the leaving group; and

(c) monitoring said colored precipitate as an indicator of the presence of an active β-lactamase.

4,978,614

METHOD OF DETECTING A SUBSTANCE USING ENZYMATICALLY-INDUCED DECOMPOSITION OF DIOXETANES

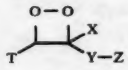
Irena Y. Bronstein, Newton, Mass., assignor to Tropix, Inc., Bedford, Mass.

Continuation-in-part of Ser. No. 265,406, Oct. 26, 1988, abandoned. This application Jul. 20, 1989, Ser. No. 382,125

Int. Cl.[5] G01N *21/76, 33/53*

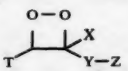
U.S. Cl. 435—21 66 Claims

1. In an assay method in which a member of a specific binding pair is detected by means of an optically detectable reaction, the improvement wherein said optically detectable reaction includes the reaction, with, an enzyme, of a dioxetane having the formula



where T is a cycloalkyl or olycycloalkyl group bonded to the 4-membered ring portion of said dioxetane by a spiro linkage; Y is a fluorescent chromophore; X is hydrogen, alkyl, aryl, aralkyl, alkaryl, heteroalkyl, heteroaryl, cycloalkyl, cycloheteroalkyl, or enzyme-cleavable group; and Z is hydrogen or an enzyme-cleavable group, provided that at least one of X or Z must be an enzyme-cleavable group, so that said enzyme cleaves said enzyme-cleavable group from said dioxetane to form a negatively charged substituent bonded to said dioxetane, said negatively charged substituent causing said dioxetane to decompose to form a luminescent substance comprising said group Y of said dioxetane.

31. A kit for detecting a first substance in a sample comprising a dioxetane having the formula



where T is a cycloalkyl group bonded to the 4-membered ring portion of said dioxetane by a spiro linkage; Y is a chromophore capable of fluorescence; X is hydrogen, alkyl, aryl, aralkyl, alkaryl, heteroalkyl, heteroaryl, cycloalkyl, cyclo heteroalkyl, or enzyme-cleavable group; and Z is hydrogen or an enzyme-cleavable group, provided that at least one of X or Z must be an enzyme-cleavable group; and an enzyme capable of cleaving said enzyme-cleavable group of said dioxetane.

4,978,615

METHOD FOR THE DETERMINATION OF THE COMPOUND HAVING MERCAPTO GROUP

Norihito Aoyama; Akira Miike; Yoshiaki Shimizu, all of Shizuoka, and Toshio Tatano, Numazu, all of Japan, assignors to Kyowa Medex Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 721,951, Apr. 11, 1985, abandoned. This application Feb. 10, 1988, Ser. No. 157,141

Claims priority, application Japan, Apr. 13, 1984, 59-74714

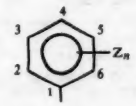
Int. Cl.[5] C12Q *1/28, 1/26, 1/00*

U.S. Cl. 435—25 13 Claims

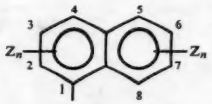
1. A method for the determination of a compound having a mercapto group, which comprises reacting said compound with a chromogen represented by formula (I):

(I)

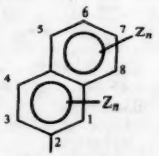
wherein Y is hydrogen or hydroxyl; R_1, R_2 and R_3 are independently selected from the group consisting of (II), (III) or (IV):



(II)



(III)



(IV)

wherein Z is independently selected from the group consisting of hydroxyl, optionally substituted amino, optionally substituted C_{1-5} alkyl, C_{2-5} alkenyl, optionally substituted phenyl, optionally substituted naphthyl, C_{2-5} acyl, halogen, nitro, sulfo, carboxyl or C_{1-4} alkoxy; and n is from 0 to 3, provided that at least one Z is hydroxyl or optionally substituted amino, wherein the optional substituents are selected from the group consisting of C_{1-5} alkyl, C_{2-5} alkenyl, phenyl, naphthyl, C_{1-4} alkoxy, hydroxyl, carboxyl, sulfo, sulfonyl, halogen, amino, C_{1-4} alkoxycarbonyl, C_{1-5} aminoalkyl, C_{2-5} acyl and nitro in the presence of peroxidase or thiol oxide reductase and qualitatively or quantitatively determining whether or not pigment is thus formed.

4,978,616

FLUIDIZED CELL CULTIVATION PROCESS

Robert C. Dean, Jr., Norwich; Peter V. Grela, Windsor, both of Vt.; Subhash B. Karkare, Thousand Oaks, Calif., and Peter W. Runstadler, Jr., Hanover, N.H., assignors to Verax Corporation, Lebanon, N.H.

Continuation-in-part of Ser. No. 932,104, Nov. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 706,872, Feb. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 527,390, Aug. 29, 1983, abandoned. This application Sep. 3, 1987, Ser. No. 92,599

Int. Cl.[5] C12P *21/00;* C12N *1/00, 5/02*

U.S. Cl. 435—70.3 15 Claims

1. A method for continuously culturing cells comprising the steps of:

(a) providing a reaction zone containing a bed of porous biocatalyst beads, said beads having immobilized therein microorganisms or cells;

(b) fluidizing said bed of biocatalyst beads with a liquid nutrient medium,

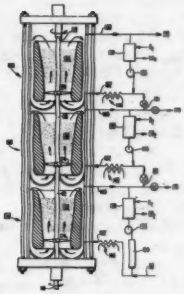
(c) separating said beads from liquid nutrient medium exiting one end of said reaction zone so that said beads remain in said reaction zone;

(d) treating a portion of the separated liquid nutrient medium in a treatment zone, separate from the reaction zone, so as to alter the temperature or composition of the separated liquid;

(e) recirculating said treated portion of the separated liquid nutrient medium back to said reaction zone as at least part of said liquid nutrient medium for fluidizing said bed of biocatalyst beads;

(f) recovering another portion of said separated liquid nutrient medium as product; and

(g) feeding fresh nutrient medium into said reaction zone at a rate equal to the recovery of separated liquid nutrient



medium as product, said rate yielding a feed dilution rate above the maximum specific growth rate of said microorganisms or cells.

4,978,617

PROCESS FOR PRODUCTION OF TOCOPHEROLS

Tsutomu Furuya, Tokyo, Japan, assignor to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 14, 1985, Ser. No. 690,906

Claims priority, application Japan, Jan. 13, 1984, 59-3651

Int. Cl.[5] C12P *17/06*; C12N *5/00, 1/00*

U.S. Cl. 435—125 **3 Claims**

1. A process for the production of tocopherols by tissue culture, which comprises the steps of:

(1) preparing a callus of a plant *Carthamus tinctorius*,

(2) inoculating the callus into a synthetic nutrient medium and culturing the callus to produce tocopherols, and

(3) recovering the tocopherols.

4,978,618

ALCOHOL PRODUCTION

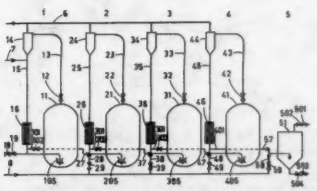
Vladimir Kalina, Lausanne, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Filed Jan. 4, 1988, Ser. No. 140,473

Claims priority, application Switzerland, Jan. 16, 1987, 149/87-0

Int. Cl.[5] C12P *7/14*; C12N *1/18*

U.S. Cl. 435—162 **13 Claims**



1. A continuous fermentation process for the production of alcohol without recycling of yeast comprising fermenting must with a flocculating yeast in an apparatus system having at least two circulation fermenters arranged in a cascade and having a decanter for separating yeast and must, continuously introducing a fresh must into a first fermenter containing flocculating yeast and introducing oxygen into the first fermenter in an amount necessary for promoting growth of the yeast in the first fermenter, transferring the fermenting must and yeast from the first fermenter to each subsequent fermenter in the cascade serially and inhibiting the growth of the yeast in each subsequent fermenter to which the fermenting must and yeast are transferred, collecting fermented must and yeast in the decanter from a last fermenter in the cascade, separating the collected fermented must and yeast by decantation and removing the separated yeast from the system, wherein the yeast has an average residence time int he must which is substantially equal to a quotient of a total quantity of yeast present in the fermenters and the decanter divided by a quantity of yeast grown per hour in the system and wherein an average time in which the must introduced into the system into the first fermenter as fresh must takes to pass through the fermenters of the cascade is shorter than the average residence time of the yeast in the must.

4,978,619

ENZYME IMMOBILIZATION BY ENTRAPMENT IN A POLYMER GEL MATRIX

Shigeru Kajiwara, Ibaraki; Hidekatsu Maeda, Nagareyama, and Hideo Suzuki, Tokyo, all of Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Continuation of Ser. No. 29,952, Mar. 25, 1987, abandoned. This application Aug. 22, 1989, Ser. No. 396,762

Claims priority, application Japan, Mar. 25, 1986, 61-66156

Int. Cl.[5] C12N *11/08, 11/04*

U.S. Cl. 435—182 **8 Claims**

1. A method for producing an immobilized enzyme, which comprises:

dispersing an enzyme powder in a water-soluble organic solvent having dissolved therein, in the range of 0.5 to 30% by weight based on the amount of said organic solvent, at least one monomer selected from the group consisting of acrylic esters, methacrylic esters, acrylamide and acrylamide derivatives which are soluble in said organic solvent, said enzyme powder not being dissolved by said organic solvent and remaining dispersed therein;

polymerizing said at least one monomer in the presence of a cross linking agent and said dispersed enzyme powder, thereby producing a get matrix in said organic solvent which entraps said dispersed enzyme powder in said gel matrix; and

displacing said organic solvent with an aqueous solvent, thereby forming gaps in said gel matrix containing said aqueous solvent with said enzyme dissolved therein such that said enzyme is entrapped in said gel matrix.

4,978,620

PROCESS FOR SEPARATING SINGLE-CHAIN TPA AND DOUBLE-CHAIN FROM EACH OTHER

Mitsuyoshi Morii; Masaharu Ohoka, both of Yokohama; Toshihiko Suzuki, Tokyo; Katsuyuki Suzuki, Hiroshima; Nobuhiro Kawashima, Sagamihara; Noriko Morii, and Kunizo Mori, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

PCT No. PCT/JP87/00598, § 371 Date Apr. 7, 1988, § 102(e) Date Apr. 7, 1988, PCT Pub. No. WO88/01294, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 10, 1987, Ser. No. 183,757

Claims priority, application Japan, Aug. 11, 1986, 61-186850; May 14, 1987, 62-115976

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.[5] C12N *9/64, 9/48*

U.S. Cl. 435—226 **1 Claim**

1. A process for separating single-chain tPA and double-chain tPA from each other, which comprises bringing an aqueous medium, which contains both single-chain tPA and double-chain tPA, into contact with an Erythrina trypsin inhibitor-bearing carrier to adsorb the tPAs on the carrier eluting the single-chain tPA specifically in a pH range of 4.4 to 6.0, and then eluting a mixture of the tPAs that is mainly double-chain tPA in a pH lower than 4.4.

4,978,621

MEROZOITE SURFACE ANTIGENS

Feroza Ardeshir, San Diego; Janette E. Flint, Del Mar, and Robert T. Reese, La Jolla, all of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Continuation of Ser. No. 775,758, Sep. 3, 1985, abandoned. This application Jun. 1, 1989, Ser. No. 366,191

Int. Cl.[5] C12N *1/00, 1/500, 1/22;* C12P *21/06*

U.S. Cl. 435—243 6 Claims

1. An isolated and purified DNA molecule selected from the group consisting of a *P. falciparum* Honduras I DNA sequence located between the Eco RI and Sal I endonucleus sites within recombinant plasmid pfC-7 which DNA sequence encodes a merozoite surface antigen having a molecular weight of approximately 75,000 or an antigenic portion thereof, and a nucleotide sequence that hybridizes to said DNA sequence and which encodes a *P. falciparum* antigen having a molecular weight of approximately 75,000.

4,978,622

CYTOPHAGA-DERIVED IMMUNOPOTENTIATOR

Robert Mishell, and William Usinger, both of Berkeley, Calif., assignors to Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 877,099, Jun. 23, 1986, abandoned. This application Sep. 1, 1989, Ser. No. 403,899

Int. Cl.[5] C08B *00/00, 37/00;* A61K *31/715, 39/00*

U.S. Cl. 435—274 8 Claims

1. Substantially pigment-free gliding bacteria adjuvant (GBA) of Cytophaga species GB-2 (ATCC Accession No. 53485), the GBA being an exopolymer polysaccharide having a spectral absorption at 455 nm of less than 0.05 in a 1% aqueous solution and containing less than about 0.5% by weight protein and less than about 0.1% by weight lipopolysaccharide.

4,978,623

METHODS AND COMPOSITIONS FOR EXPRESSION OF BTI ENDOTOXIN

Alan M. Walfield, and Thomas J. Pollock, both of San Diego, Calif., assignors to Snytro Corporation, Lenexa, Kans.

Continuation of Ser. No. 582,506, Feb. 22, 1984, abandoned. This application Jan. 13, 1987, Ser. No. 8,069

Int. Cl.[5] C12N *1/21, 15/32, 15/63, 15/70*

U.S. Cl. 435—320 4 Claims

1. A DNA construct comprising a DNA sequence in bacteriophage lambda SYN A 4-1 having A.T.C.C. Accession No. 40098 and encoding BTI endotoxin having a molecular weight of 58,000 daltons on polyacrylamide-SDS gels joined to a replicon other than the native BTI plasmid replicon associated as found in *B. thuringiensis.*

4,978,624

REAGENT FOR THE DETERMINATION OF A DIFFERENTIAL WHITE BLOOD CELL COUNT

John F. Cremins, Waterbury, Conn.; Young R. Kim, Hartsdale, N.Y.; Michael J. Malin, Park Ridge, N.J., and Louis D. Sclafani, Carmel, N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Division of Ser. No. 9,423, Feb. 2, 1987, Pat. No. 4,801,549, which is a continuation of Ser. No. 773,166, Sep. 6, 1985, abandoned. This application Sep. 14, 1988, Ser. No. 244,185

Int. Cl.[5] G01N *31/00, 33/48*

U.S. Cl. 436—17 16 Claims

1. A composition for use as a reagent solution in the determination of a differential white blood cell count which comprises, in admixture, an aqueous solution of:

(a) a surfactant;

(b) formaldehyde in a concentration of from about 4.5% to about 6.6% weight/volume;

(c) a sugar alcohol; and

(d) a buffer to maintain the pH of said composition at between about 6.6 and 7.6.

4,978,625

FLUORESCENCE IMMUNOASSAY USING WATER INSOLUBLE DYES

Daniel B. Wagner, Raleigh; Glenn P. Vonk, Fuquay-Varina, and Thomas J. Mercolino, Chapel Hill, all of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Oct. 19, 1987, Ser. No. 109,689

Int. Cl.[5] G01N *33/543*

U.S. Cl. 436—518 18 Claims

1. A method for determining an unknown quantity of an analyte in a liquid comprising:

(a) contacting a solid support having affixed thereto an antianalyte specific for an analyte with a liquid suspected of containing said analyte and with a tracer comprising a sac with aqueous and nonaqueous portions, said sac including a substantially water insoluble fluorescent lanthanide chelate occluded substantially in the nonaqueous portion of said sac whereby said analyte binds to said antianalyte and said tracer binds to one of said analyte and said antianalyte to give a bound fraction on said support;

(b) separating said support having bound fraction thereon from said liquid, said bound fraction including an intact sac with said lanthanide chelate therein;

(c) exciting lanthanide chelate in said intact sac by applying electromagnetic radiation thereto;

(d) detecting fluorescence from said lanthanide chelate; and

(e) determining the quantity of said analyte in said liquid by comparing the magnitude of said fluorescence with the magnitude of fluorescence established for a known quantity of the analyte.

4,978,626

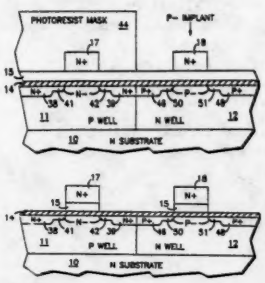
LDD TRANSISTOR PROCESS HAVING DOPING SENSITIVE ENDPOINT ETCHING

Stephen S. Poon; James R. Pfiester; Frank K. Baker, and Jeffrey L. Klein, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 2, 1988, Ser. No. 240,013

Int. Cl.[5] H01L *21/265, 21/28, 27/092*

U.S. Cl. 437—44 12 Claims



1. A process for forming a lightly doped drain (LDD) transistor by using impurity sensitive endpoint etching, comprising the steps of:

providing a substrate of a first conductivity type;

providing a well region of a second conductivity type in the substrate;

forming a layer of gate dielectric over the well region;

depositing a layer of gate electrode material over the layer of gate oxide, said layer of gate electrode material having first and second thicknesses, the first thickness having a first impurity concentration and the second thickness being not less than the first thickness with a second impurity concentration;

patterning a gate electrode from the second thickness of gate electrode material by selectively depositing a pattern forming material onto a predetermined portion of the layer of gate electrode material;

selectively etching by chemical etch reaction the first thickness of the layer of gate electrode material to form said gate electrode, thereby exposing a top surface of the first thickness of the layer of gate electrode material adjacent each side of said gate electrode, said selective etching implemented by monitoring either one of a chemical product or a chemical reactant of the chemical etch reaction or by monitoring a ratio of the chemical product and chemical reactant of the chemical etch reaction and detecting a change of a monitored value upon completion of etching the first thickness of the layer of gate electrode material;

forming a lightly doped drain transistor around the gate electrode by implanting heavily and lightly doped source/drain regions of the first conductivity type, then completing the etching of the layer of gate electrode material to expose the layer of gate dielectric.

9. A process for forming a lightly doped drain transistor, comprising the steps of:

providing a substrate of first conductivity type;

forming first and second well regions of first and second conductivities, respectively, in the substrate;

forming a layer of gate dielectric over the well regions;

depositing a layer of gate electrode material over the layer of gate dielectric material having first and second thicknesses, the first thickness having a first impurity concentration and the second thickness being not less than the first thickness with a second impurity concentration;

patterning first and second gate electrodes over the first and second well regions, respectively, from the second thickness of gate electrode material by selectively depositing a pattern forming material onto first and second predetermined portions of the layer of gate electrode material;

selectively etching by chemical etch reaction the first thickness of the layer of gate electrode material to form the first and second gate electrodes, thereby exposing the layer of gate electrode material adjacent the first and second gate electrodes;

selectively implanting lightly doped source/drain diffusions of the first conductivity type into the first well region and adjacent the first gate electrode;

selectively implanting heavily doped source/drain diffusions of the second conductivity type into the second well region and adjacent the second gate electrode;

forming disposable sidewall spacers adjacent the sides of the first and second gate electrodes;

selectively implanting heavily doped source/drain diffusions of the first conductivity type into the first well region and adjacent outside edges of the sidewall spacers of the first gate electrode;

selectively implanting heavily doped source/drain diffusions of the second conductivity type into the second well region and adjacent outside edges of the sidewall spacers of the second gate electrode; and

after said implantation steps, etching the second thickness of gate electrode material adjacent the first and second gate electrode to expose a top surface of the layer of gate dielectric.

4,978,627

METHOD OF DETECTING THE WIDTH OF LIGHTLY DOPED DRAIN REGIONS

Yow-Juang Liu, San Jose, and Zahra Hadjizadeh-Amini, Cupertino, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 313,984, Feb. 22, 1989. This application Nov. 30, 1989, Ser. No. 443,886

Int. Cl.[5] H01L *21/66, 21/265*

U.S. Cl. 437—44 **20 Claims**

1. A method of fabricating, in a substrate, a field effect transistor including lightly-doped drain regions having a selected width, comprising the steps of:

(a) forming a pair of reference structures separated by a distance of twice the selected width on the substrate and forming a gate structure on the substrate, the two reference structures having substantially parallel edges defining a test region having a length and width;

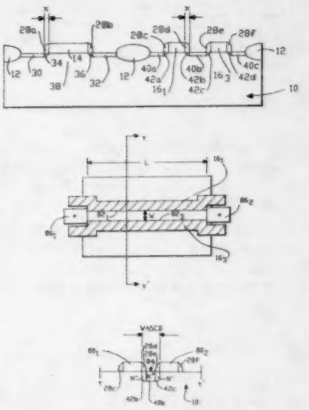
(b) concurrently implanting lightly-doped drain regions self-aligned with the ends of the gate structure and implanting a dopant in the test area using a first implant dosage;

(c) forming spacers extending laterally from the ends of the gate structure and from the reference structures;

(d) optically determining that the spacers have the selected width by detecting that the spacers fill the region between the reference structures;

(e) concurrently implanting source and drain regions self-aligned with the spacers in selected portions of the lightly-doped regions and implanting a dopant in the test area using the spacers as masks using a second implant dosage greater than the first implant dosage;

(f) electrically detecting the width of the spacers, by:



(i) measuring the sheet resistance R_{SN-} of the substrate de to the first implant dosage,

(ii) measuring the sheet resistance R_{SN+} of the substrate due to the combination of the first and second implant dosages,

(iii) measuring the resistance R of the test region, and

(iv) calculating the width of the spacers and thus the lightly-doped drain regions based upon the measured resistance values; and

(g) characteristics the electrical performance of the field effect transistor based on the width of the spacers detected in said step (f).

4,978,628

DRAIL-WELL/EXTENSION HIGH VOLTAGE MOS TRANSISTOR STRUCTURE AND METHOD OF FABRICATION

Bruce D. Rosenthal, Sunnyvale, Calif., assignor to Teledyne Industries, Inc., Mountain View, Calif.

Division of Ser. No. 932,707, Nov. 19, 1986, abandoned. This application Jun. 16, 1988, Ser. No. 177,932

Int. Cl.[5] H01L *21/265*

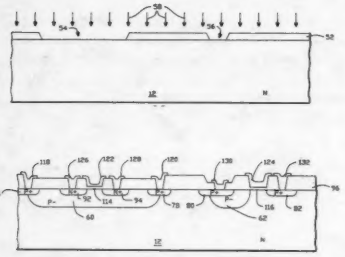
U.S. Cl. 437—44 **7 Claims**

1. A method of simultaneously fabricating a high-voltage transistor and a complementary conductivity high-speed transistor at the surface of a substrate, said method comprising the steps of:

(a) providing a semiconductor layer having a first predetermined conductivity type at the surface of said substrate;

(b) simultaneously forming first and second well regions in said semiconductor layer and adjacent a surface thereof, said first and second well regions being of a second predetermined conductivity type; and

(c) forming first and second pairs of source and drain regions at the surface of said semiconductor layer, said first pair of source and drain regions being of said first predetermined conductivity typed and formed in said first well region so as to define a high-speed transistor channel region in said well region, said second pair of source and drain regions being of said second predetermined conductivity type, the source region of said second pair being formed spaced



apart from said second well region at the surface of said semiconductor layer so as to define a high-voltage transistor channel region in said semiconductor layer, at least a portion of the drain region of said second pair being formed within said second well region such that the drain region of said second pair is encapsulated within a drain extension portion of said second well region with respect to the full depth and width of said high-voltage channel region.

4,978,629

METHOD OF MAKING A METAL-OXIDE-SEMICONDUCTOR DEVICE HAVING SHALLOW SOURCE AND DRAIN DIFFUSED REGIONS

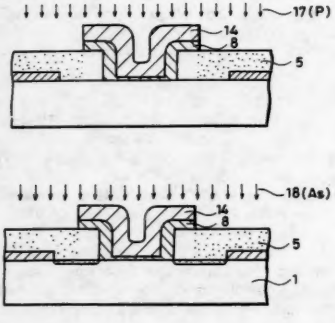
Shigeki Komori, and Katsuhiro Tsukamoto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1989, Ser. No. 410,203

Claims priority, application Japan, Oct. 3, 1988, 63-249347

Int. Cl.[5] H01L *29/78*

U.S. Cl. 437—41 **6 Claims**



1. A method of manufacturing a metal-oxide-semiconductor device, comprising the steps of:

forming a first conductive layer made of polysilicon on the major surface of a semiconductor substrate with portions of said first conductive layer separated from said substrate by a first insulating layer;

etching an opening in said first conductive layer to form source and drain conductors spaced apart from each other on said substrate to define opposite sides of a channel region;

forming a second insulating layer on an upper surface of said first conductive layer and on the sidewall of said opening, and with a surface portion of the substrate exposed through said opening;

forming a thin gate oxide layer on said exposed surface portion of said substrate;

forming a second conductive layer on said gate oxide layer and overlying said second insulating layer;

etching said second conductive layer to form a gate electrode overlying said gate oxide layer and a portion of said second insulating layer;

implanting impurity selectively into said first conductive layer using said second conductive layer as a mask; and

thermally diffusing the impurity implanted in said first conductive layer to form source and drain impurity regions in said substrate.

4,978,630

FABRICATION METHOD OF BIPOLAR TRANSISTOR

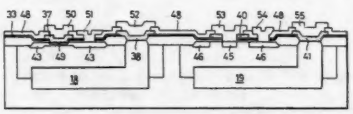
Myung S. Kim, Seoul, Rep. of Korea, assignor to Samsung Semiconductor & Telecommunication Co., Ltd., Kyungsang Bukdo, Rep. of Korea

Filed Sep. 26, 1988, Ser. No. 249,310

Claims priority, application Rep. of Korea, Sep. 26, 1987, 87-10712

Int. Cl.[5] H01L *21/20*

U.S. Cl. 437—32 **11 Claims**



1. A method for fabricating a lateral PNP transistor including a field plate, comprising the steps of:

forming a base region on a substrate;

forming a doped polycrystalline silicon layer over the substrate; etching said polycrystalline silicon layer to form a base electrode made of polycrystalline silicon and contacting said base region, and to form said field plate from polycrystalline silicon;

using said polycrystalline silicon field plate as a mask, forming an emitter and a collector region for said lateral PNP transistor on the substrate by ion implantation, whereby the use of said polycrystalline silicon field plate as a mask permits the formation of the emitter and collector regions without an additional mask and etching step; depositing an oxide layer over the substrate;

annealing said ion implanted emitter and collector diffusion regions subsequent to deposition of said oxide layer;

opening respective contact windows in said oxide layer for the emitter region, the collector region, and the base electrode; and

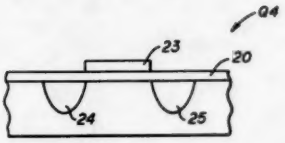
forming metal contacts within respective windows for said emitter region, said collector region, and said base electrode; said contact window of said emitter region overlaps said polycrystalline silicon field plate, whereby the metal contact in said emitter contact window contacts said field plate.

4,978,631

CURRENT SOURCE WITH A PROCESS SELECTABLE TEMPERATURE COEFFICIENT

Richard A. Blanchard, Los Altos, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Filed Jul. 25, 1986, Ser. No. 890,218
Int. Cl.[5] H01L 21/265
U.S. Cl. 437—24 10 Claims



1. A method for forming a current source comprising the steps of:

forming a gate insulation layer on a portion of a surface of semiconductor material;

introducing ions into said gate insulation layer, said ions retaining their charge;

forming a gate on said gate insulation layer;

forming a source region and a drain region within said semiconductor material; and

electrically connecting said source region to said gate,

wherein said method further comprises the step of controlling the temperature coefficient of said current source, said step of controlling comprising the step of controlling the number of said ions in said gate insulation layer.

4,978,632

METHOD OF PRE-TREATING SAMPLES IN PEROXIDASE-CATALYZED ENZYME ASSAYS

Patrick A. Mach, Shorewood; Jeffrey A. Thompson, Richfield; Richard S. Creager, Bloomington, and Cheri W. Fink, Prairie, all of Minn., assignors to Kallestad Diagnostics, Inc., Chaska, Minn.

Filed Dec. 15, 1988, Ser. No. 284,541
Int. Cl.[5] G01N 33/535; C12Q 1/28
U.S. Cl. 435—7 9 Claims

7. A method for detecting the presence of an analyte using a peroxidase-catalyzed sandwich enzyme immunoassay the method comprising the steps of:

(a) providing a clinical specimen suspected of containing analyte and containing blood or blood products;

(b) reducing the occurrence of falsely elevated assay results by reacting the specimen with a sufficient amount of sodium hypochlorite to eliminate interference in the immunoassay caused by the blood or blood products; and subsequently

(c) detecting the analyte in the specimen with which the sodium hypochlorite was reacted in the peroxidase - catalyzed sandwich enzyme immunoassay.

4,978,633

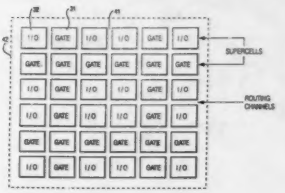
HIERARCHICAL VARIABLE DIE SIZE GATE ARRAY ARCHITECTURE

David F. Seefeldt, Palm Bay; Michael J. Iacoponi, Indian Harbor Beach, and David K. Vail, Jr., Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 22, 1989, Ser. No. 396,653
Int. Cl.[5] H01L 21/70, 27/00
U.S. Cl. 437—51 8 Claims

1. A method of manufacturing an integrated circuit device comprising the steps of:

forming, in a semiconductor wafer, an array of circuit devices separated from one another by a network of routing channels through the selective interconnection of which circuit devices may implement a prescribed signal processing function, said array of circuit devices including first circuit devices each of which is configurable to perform a respective signal processing operation, and second circuit devices each of which is configurable to effectively perform input/output interfacing between said first circuit devices and signal terminals external to said array, said first and second circuit devices being intermingled with one another in said array in accordance with a prescribed two-dimensional distribution pattern;



selectively interconnecting prescribed ones of said first and second circuit devices within at least one prescribed portion of said array to thereby effectively form an integrated circuit architecture capable of implementing said prescribed signal processing function;

separating said prescribed portion of said array from said wafer; and

coupling said integrated circuit architecture resident in said separated portion of said array to signal coupling terminals of an integrated circuit chip carrier by way of selected portions of second circuit devices.

4,978,634

METHOD OF MAKING TRENCH DRAM CELL WITH STACKED CAPACITOR AND BURIED LATERAL CONTACT

Bing-Whey Shen, Richardson; Masaaki Yashiro; Randy McKee, both of Plano; Gishi Chung; Kiyoshi Shirai, both of Dallas; Clarence Teng, and Donald J. Coleman, Jr., both of Plano, all of Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Filed Jul. 25, 1989, Ser. No. 385,327
Int. Cl.[5] H01L 21/265
U.S. Cl. 437—52 5 Claims

1. A process for forming a DRAM cell, comprising the steps of:

forming a trench in a substrate;

forming a first insulating layer on the surfase of said trench;

forming a first conductive layer on said first insulating layer;

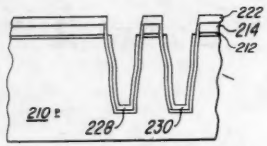
forming a second insulating layer on said first conductive layer;

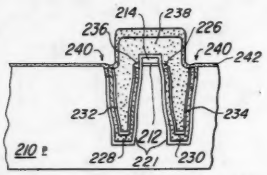
forming a second conductive layer on said second insulating layer;

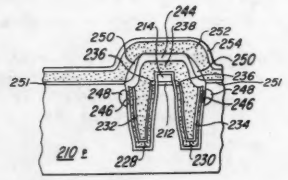
removing a portion of said first insulating layer between said

substrate and said first conductive layer to provide a cavity;

filling said cavity with a conductive material; and







forming a transistor on the surface of said substrate, adjacent to said trench, one source/drain of said transistor being conductively connected to said conductive material.

4,978,635

METHOD OF MAKING A SEMICONDUCTOR MEMORY DEVICE

Jinzo Watanabe, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 276,596, Nov. 28, 1988. This application Apr. 9, 1990, Ser. No. 507,079

Claims priority, application Japan, Dec. 2, 1987, 62-306135

Int. Cl.[5] H01L 21/70

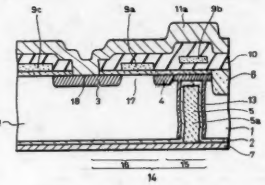
U.S. Cl. 437—52 **5 Claims**

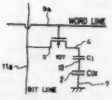
1. A method for manufacturing a semiconductor memory device comprising the steps of:

preparing a semiconductor substrate having a main surface and a surface of the reverse side surface;

forming a MOSFET on the main surface of said semiconductor substrate;

forming a storage capacity element on the surface of the reverse side of said semiconductor substrate; and





forming a diffusion region of a memory cell portion in said semiconductor substrate for connecting said MOSFET to said storage capacity element.

4,978,636

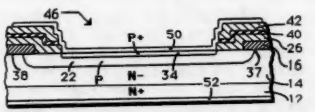
METHOD OF MAKING A SEMICONDUCTOR DIODE

Kevin B. Jackson, Phoenix, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Filed Dec. 26, 1989, Ser. No. 456,913

Int. Cl.[5] H01L 21/22

U.S. Cl. 437—150 **13 Claims**



1. A process for forming a passivated semiconductor junction, comprising:

providing a substrate having a semiconductor surface of a first conductivity type;

forming a thermal oxide on the surface;

providing a first doped region of a second conductivity type opposite the first type through a window in the thermal oxide and extending to the surface;

covering the first doped region exposed in the window and a portion of the thermal oxide surrounding the window with a first deposited silica glass;

opening a second window in the deposited silica glass extending to the semiconductor surface within the first doped region and introducing therethrough a second dopant of the second conductivity type into the semiconductor surface to form a second doped region of higher conductivity than the first doped region;

providing a nitride layer over the first deposited silica glass and a second deposited silica glass over the nitride layer; and

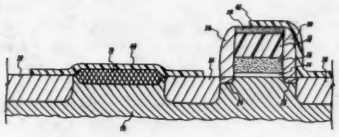
providing a metallic region in contact with the second doped region.

4,978,637

LOCAL INTERCONNECT PROCESS FOR INTEGRATED CIRCUITS

Fu-Tai Liou; Yih-Shung Lin, both of Carrollton, and Fusen E. Chen, Dallas, all of Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Filed May 31, 1989, Ser. No. 359,860
Int. Cl.[5] H01L 21/283, 21/336
U.S. Cl. 437—193 9 Claims



1. A method for forming electrical interconnections in an integrated circuit, comprising the steps of:

forming a gate oxide layer on a substrate;

forming a gate polycrystalline silicon layer over the gate oxide layer;

forming a first conductive layer including metal over the gate polycrystalline silicon layer;

forming a conductive cap layer over the first conductive layer including metal;

patterning the gate oxide, gate polycrystalline silicon, first conductive layer including metal, and conductive cap layers to form gates over active regions in the substrate;

forming sidewall insulating regions on the gates;

forming a second conductive layer including metal over the integrated circuit; and

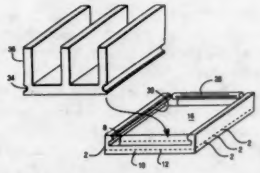
patterning the second conductive layer including metal to form electrical interconnections, wherein the conductive cap layer protects the first conductive layer from damage during such patterning step and wherein the second conductive layer makes electrical contact with the gates through the conductive cap layer, whereby electrical connections are made between the gates and the substrate through the second conductive layer.

4,978,638

METHOD FOR ATTACHING HEAT SINK TO PLASTIC PACKAGED ELECTRONIC COMPONENT

Marvin L. Buller, Austin; Barbara J. McNelis, and Campbell H. Snyder, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1989, Ser. No. 454,655
Int. Cl.[5] H01L 23/40
U.S. Cl. 437—209 7 Claims



1. A method of thermally enhancing a rectangular plastic packaged electronic component comprising the steps of:

providing a first member of a pair of complementary matingly engageable elements on an upper planar surface of said component and a second member of said pair of engageable elements on bottom edges of a heat sink; and

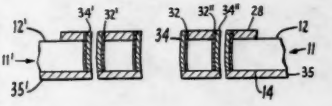
joining said component and heat sink.

4,978,639

METHOD FOR THE SIMULTANEOUS FORMATION OF VIA-HOLES AND WRAPAROUND PLATING ON SEMICONDUCTOR CHIPS

Chang-Hwang Hua, Palo Alto; Simon S. Chan, Belmont; Ding-Yuan S. Day, Sunnyvale, and Adrian C. Lee, Fremont, all of Calif., assignors to Avantek, Inc., Milpitas, Calif.

Filed Jan. 10, 1989, Ser. No. 295,300
Int. Cl.[5] H01L 21/02
U.S. Cl. 437—230 8 Claims



1. A method for simultaneously producing plated via-holes and wraparound plating in semiconductor chips formed from a semiconductor wafer having a front surface including a plurality of metal pads, a back surface, and a thickness measured from the front surface to the back surface, the method comprising the steps of:

(i) forming via-holes and grooves in the wafer from its front surface, the grooves defining the boundaries of individual semiconductor chips, the grooves and the via-holes extending from the front surface of the wafer to a depth within the wafer which is less than the total thickness of the wafer, the via-holes being formed through selected metal pads, the grooves and via-holes each having walls and a floor;

(ii) simultaneously plating the walls and floor of the grooves and the via-holes with conductive metal;

(iii) removing a portion of the back surface of the semiconductor wafer to a depth sufficient to remove the floor of both the grooves and the via-holes, thereby exposing the metal plating located on the walls of both the via-holes and the grooves, thus separating the individual chips; and

(iv) plating the back surface of the individual chips with conductive metal.

4,978,640

DISPERSION STRENGTHENED COMPOSITE

John R. Kelly, Wellesley Hills, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 24, 1988, Ser. No. 159,781
Int. Cl.[5] C03C 14/00
U.S. Cl. 501—32 21 Claims

1. A dispersion-strengthened composite comprising a glass matrix reinforced with filler particles having a mean particle size centered around values in the range 0.01–0.7 micron, inclusive,

said filler particles being chosen from the group consisting essentially of alumina, zirconia, silica, aluminosilicates, and silicates,

the chemical composition of said composite being different from the chemical composition of the glass used to prepare said composite.

4,978,641

POROUS GLASS AND PROCESS FOR ITS PRODUCTION

Keisuke Wada, Yokohama, and Yasushi Tsurita, Tokyo, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,772
Claims priority, application Japan, Aug. 17, 1988, 63-204460
Int. Cl.[5] C03C *11/00, 10/10*
U.S. Cl. 501—39 5 Claims

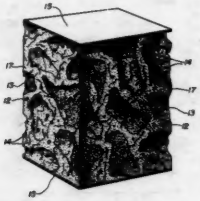
1. Porous glass consisting essentially of silica, zirconia and an alkali metal compound, wherein the content of zirconia is at least 5% by weight and the content of the alkali metal compound is at least 2% by weight as calculated as M_2O wherein M is an alkali metal element, and the total pore volume (A) of pores having pore radii of from 20 to 10,000 Å is at least 0.2 ml/g, and the proportion of the pore volume (B) of pores having pore radii of from 100 to 10,000 Å to the said total pore volume (A) is at least 80%.

4,978,642

RIGID, WATER-RESISTANT PHOSPHATE CERAMIC MATERIALS HAVING ACOUSTIC CHANNELING AND PROCESSES FOR PREPARING THEM

Jeffery L. Barrall, Lancaster, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Feb. 15, 1989, Ser. No. 310,857
Int. Cl.[5] C04B *38/00*
U.S. Cl. 501—84 8 Claims



1. A composition suitable to provide a rigid, water-resistant phosphate ceramic product having acoustic channeling sufficient to provide a noise resistance coefficient of at least 50, comprising 220–270 part of two components:

one component being from about 5 to 20 parts by weight calculated as the hydrate of at least one oxide or hydrate selected from the group consisting of calcium oxide and aluminum oxide and their hydrates and from 100 to 125 parts by weight of phosphoric acid in a water solution; and

a second component being from about 15 to 25 parts by weight of at least one oxide selected from the group consisting of magnesium oxide and zinc oxide, and about 100 parts by weight of calcium silicate,

the ratio of the magnesium oxide and/or zinc oxide in the second component to the hydrate in the first component being greater than 1.

4,978,643

FORMING WHISKER REINFORCED SINTERED CERAMICS WITH POLYMERIZABLE BINDER PRECURSORS

Krishna Venkataswamy, Framingham; Richard Waack, Wayland; Bruce E. Novich, Lexington, and John W. Halloran, Hopkinton, all of Mass., assignors to Ceramics Process Systems Corporation, Milford, Mass.

Continuation of Ser. No. 54,628, May 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 34,099, Apr. 1, 1987, abandoned, which is a continuation-in-part of Ser. No. 36,377, Apr. 9, 1987, Pat. No. 4,882,304. This application Sep. 23, 1988, Ser. No. 249,210
Int. Cl.[5] C01B *31/00*
U.S. Cl. 501—94 8 Claims

1. A process for forming a dense article, comprising:

(a) providing a mixture of components consisting essentially of sinterable particles, polymerizable monomers, high aspect ratio particles, solvent, and dispersant, the mixture having at least 45% by volume of total solids including the sinterable and high aspect ratio particles, and 5–40% by volume of high aspect ratio particles;

(b) agitating the mixture under high energy to produce a slurry having a viscosity of not more than 10,000 cPs at $100\ s^{-1}$;

(c) injecting the slurry into a closed mold of a desired shape at an injection pressure of not more than 100 psi;

(d) heating the slurry to a sufficient temperature and for a sufficient length of time to polymerize the monomers, resulting in a rigid green article; and

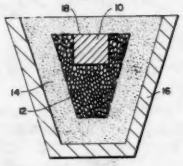
(e) firing the green article to produce a densified article.

4,978,644

PROCESS FOR PREPARING SELF-SUPPORTING BODIES AND PRODUCTS MADE THEREBY

Danny R. White, Elkton, Md., and Terry D. Claar, Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Continuation of Ser. No. 296,774, Jan. 13, 1989, Pat. No. 4,904,446. This application Dec. 12, 1989, Ser. No. 449,521
Int. Cl.[5] C04B *34/58*
U.S. Cl. 501—96 5 Claims



1. A method for producing a self-supporting body comprising:

selecting a parent metal;

heating said parent metal in a substantially inert atmosphere to a temperature above its melting point to form a body of molten parent metal;

contacting said body of molten parent metal with a permeable mass comprising boron nitride and at least one material selected from the group consisting of boron carbide, a boron donor material, and a carbon donor material;

maintaining said temperature for a time sufficient to permit infiltration of molten parent metal into said permeable mass and to permit reaction of said molten parent metal with at least a portion of said permeable mass; and

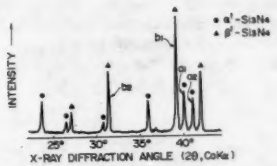
continuing said infiltration and reaction for a time sufficient to produce said self-supporting body.

4,978,645

SILICON NITRIDE SINTERED BODY

Yoshio Ukyo, Aichi; Shigetaka Wada, Mie, and Kazumasa Takatori, Aichi, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Apr. 7, 1989, Ser. No. 334,553
Claims priority, application Japan, Apr. 7, 1988, 63-86721
Int. Cl.[5] C04B 35/58
U.S. Cl. 501—98 8 Claims



1. A sialon sintered body consisting essentially of α'-silicon nitride and β'-silicon nitride, the ratio of said α'-silicon nitride and said β'-silicon nitride in terms of the peak strength ratio of X-ray diffraction being 0.05–0.50 to 0.95–0.50, and said α'-silicon nitride having an average grain size of crystal not more than 2.0 μm and said β'-silicon nitride having an average grain size of crystal not more than 5.0 μm in major axis and not more than 1.0 μm in minor axis.

4,978,646

CAPACITORS AND HIGH DIELECTRIC CONSTANT CERAMICS THEREFOR

Pronob Bardhan, Corning; Roger F. Bartholomew, Painted Post; Donald M. Trotter, Jr., Newfield, and Chyang J. Yu, Painted Post, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Mar. 3, 1989, Ser. No. 318,698
Int. Cl.[5] C04B 35/02, 35/46
U.S. Cl. 501—134 23 Claims

1. A dielectric ceramic exhibiting a small temperature coefficient of capacitance across the temperature range of −55° C. to 125° C. when compared to the capacitance measured at room temperature at 1 KHz or 1 MHz, depending upon the capacitance of the material, and a dielectric constant in excess of 105, when measured at room temperature at 1 KHz or 1 MHz, which dielectric ceramic has a composition corresponding to the formula:

$$(Bi_2O_2)^{2+}(A_{m-1}B_mO_{3m+1})^{2-}$$

wherein A consists essentially of at least one element selected from the group consisting of Ca, Sr, Ba, Bi, and Pb, and B consists essentially of at least one element selected from the group consisting of Nb, Ta, and Ti, and at least part of B is replaced with a single pair of mixed ions selected from the group consisting of

$$C_i^{2+}D_i^{5+} \quad (1)$$

$$E_i^{1+}D_i^{5+} \quad (2)$$

$$F_i^{3+}D_i^{5+} \quad (3)$$

and

$$F_i^{3+}G_i^{6+} \quad (4)$$

wherein

C^{2+} ions are selected from the group consisting of Mg^{2+}, Zn^{2+}, Ni^{2+}, Co^{2+}, Cu^{2+}, and Cd^{2+};

D^{5+} ions are selected from the group consisting of Nb^{5+} and Ta^{5+};

E^{+} ions are selected from the group consisting of Li^{+}, Na^{+}, K^{+}, Cu^{+}, and Ag^{+};

F^{3+} ions are selected from the group consisting of Cr^{3+}, Fe^{3+}, Al^{3+}, Ga^{3+}, Tl^{3+}, As^{3+}, Sb_{3+}, Y^{3+}, Lu^{3+}, Yb^{3+}, Tm^{3+}, Er^{3+}, Ho^{3+}, Dy^{3+}, Tb^{3+}, Gd^{3+}, Eu^{3+}, and Sm^{3+}; and

G^{6+} ions are selected from the group consisting of W^{6+} and Mo^{6+};

and wherein m is greater than 1.

4,978,647

GEL BEAD COMPOSITION FOR METAL ADSORPTION

Charles D. Scott; Charlene A. Woodward, and Charles H. Byers, all of Oak Ridge, Tenn., assignors to United States Department of Energy, Washington, D.C.

Filed Apr. 4, 1989, Ser. No. 333,064
Int. Cl.[5] B01J 37/36, 20/22; C12N 11/12, 11/04
U.S. Cl. 502—7 3 Claims

1. A gel bead consisting essentially of a sufficient amount of water and propylene glycol alginate to allow for bead formation and a sufficient amount of bone gelatin to allow for metal absorption and chemically crosslinked in an alkaline medium to form a stable structure.

3. A gel bead of claim 1 having contained therein a biological absorbent capable of removing metals from solution.

4,978,648

CATALYSTS FOR THE POLYMERIZATION OF OLEFINS

Pier C. Barbé; Luciano Noristi, both of Ferrara; Raimondo Scordamaglia, Milan; Luisa Barino, Novara; Enrico Albizzati, Arona; Umberto Giannini, Milan, and Giampiero Morini, Voghera, all of Italy, assignors to Himont Incorporated, Wilmington, Del.

Filed Sep. 27, 1989, Ser. No. 413,430
Claims priority, application Italy, Sep. 30, 1988, 22151 A/88
The portion of the term of this patent subsequent to Nov. 20, 2007, has been disclaimed.
Int. Cl.[5] C08F 4/646
U.S. Cl. 502—127 11 Claims

1. A catalyst for the polymerization of olefins comprising the reaction product of:

(a) an Al-alkyl compound;

(b) an ether with at least 2 ether groups capable of complexing anhydrous magnesium dichloride under standard reaction conditions when present in an amount of less than 60 mmols per 100 g magnesium dichloride; and

(c) a solid catalyst component comprising anhydrous magnesium dihalide in active form and having supported thereon a titanium compound containing at least one Ti-halogen bond and a electron-donor compound which is more than 70 mole % extractable from the solid with Al-triethyl, wherein the solid after extraction has a surface area of more than 20 m^2/g.

4,978,649

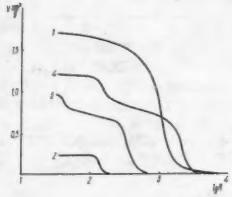
POROUS CARBONACEOUS MATERIAL

Vitaly F. Surovikin, Lermontova, 20, kv. 80; Georgy V. Plaxin, Rokossovskogo, 8, korpus 2, kv. 105, both of Omsk; Vladimir A. Semikolenov, Vyazemskogo, 2, kv. 11; Vladimir A. Likholobov, Detsky prospekt, 8, kv. 9, both of Novosibirsk, and Ilona J. Tiunova, Lukashevicha, 27, kv. 133, Omsk, all of U.S.S.R.

Filed Apr. 19, 1989, Ser. No. 340,893
Claims priority, application U.S.S.R., Apr. 19, 1988, 4443666[U]
Int. Cl.[5] C01B 31/10; B01J 20/20, 21/18; C09C 1/48
U.S. Cl. 502—416 4 Claims

1. A process for producing a porous carbonaceous material, comprising heating a mass of granules of carbon black, to between 750° and 1,200° C., while continuously stirring the heated granules to prevent their sticking together, passing

hydrocarbons through the mass of granules under conditions wherein said hydrocarbons decompose into carbon and deposit the carbon on the surface of the granules, and treating said granules with an activator gas comprising steam for 0.5 to 7 hours to form a pore volume of 0.2 to 1.7 cm^3/g and to increase the proportion of pores of a size of more than 200 Å.



3. A porous carbonaceous material prepared by the process of claim 1 in the form of a three-dimensional matrix with a pore volume of 0.2–1.7 cm^3/g formed by bent layers of carbon of 100–10,000 Å thickness and a radius of curvature of 100–10,000 Å, a true density of said material being equal to 1.80–2.10 g/cm^3, X-ray density—2.112–2.236 g/cm^3 and the pore size distribution having its maximum within the range of 200–2,000 Å.

4,978,650

DESENSITIZING ACTIVATED CARBON SORBENTS TO THE EFFECTS OF HUMIDITY

Robert W. Coughlin, Storrs, and Edward M. Davis, Cheshire, both of Conn., assignors to SymBiotech Incorporated, Wallingford, Conn.

Filed Aug. 15, 1988, Ser. No. 232,588

Int. Cl.[5] C01B *31/10, 31/08;* **B01J** *20/20*

U.S. Cl. 502—432 **10 Claims**

1. A method of treating oxygen-containing activated carbon sorbents to improve their sorptive performance in humid environments comprising the steps:

(a) maintaining said activated carbon in contact with a de-oxygenating gas at a temperature between about 600° and 1200° C. and a total pressure between about 0.1 to 2 atmospheres, and for a time period ranging from a few minutes to several hours,

(b) cooling the activated carbon resulting from step (a) to a temperature in the range of about room temperature to 550° C. while in contact with a de-oxygenating gas at a pressure in the range of 0.1 to 2 atmospheres,

(c) maintaining the activated carbon resulting from step (b) in contact with a passivating substance chosen from the group consisting of an olefin, an alcohol and mixtures thereof, for a time period ranging from about a minute to several hours at a temperature in the range of about room temperature to 550° C. and a total pressure in the range of about 0.1 to 2 atmospheres whereby said passivating substance is permitted to react with said carbon to stabilize said carbon so it will not readily react with oxygen or water vapor after cooling,

(d) in the event that step (c) is conducted above room temperature, cooling the carbon resulting from step (c) to room temperature while maintaining it in contact with a de-oxygenating gas.

4,978,651

PHENOLIC COMPOUNDS AND RECORDING MATERIAL COMPRISING THE SAME

Hiromi Furuya, Shimizu, and Kunio Hayakawa, Gotemba, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

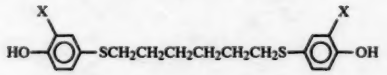
Filed Jun. 21, 1989, Ser. No. 369,021

Claims priority, application Japan, Jun. 23, 1988, 63-156403; Sep. 30, 1988, 63-247040

Int. Cl.[5] B41M *5/16, 5/18*

U.S. Cl. 503—216 **3 Claims**

1. A recording material comprising a colorless or light-colored leuco dye, and a phenolic compound having formula (I) capable of inducing color formation in said colorless or light-colored leuco dye upon reacting therewith:



(I)

wherein X represents a chlorine atom or a methyl group.

4,978,652

METHOD OF MAKING A COLOR FILTER ARRAY ELEMENT USING A HEATED EMBOSSED SURFACE

Michael J. Simons, Middlesex, Great Britain, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 18, 1989, Ser. No. 408,580

Claims priority, application United Kingdom, Oct. 18, 1988, 8824365.4

Int. Cl.[5] B41M *5/035, 5/26*

U.S. Cl. 503—227 **7 Claims**

1. A method of making an array of a repeating mosaic pattern of colorants carried on a support using

(a) a plurality of donor materials each comprising respectively a sublimable dye of a different color, and

(b) a receiver element comprising a support 10 having thereon a dye-receiving layer, wherein each donor material is in turn brought into face-to-face contact with the receiver and heated patternwise by contact with a heated embossed surface to transfer the desired pattern of dye to the receiver layer.

4,978,653

DERIVATIVE OF 2-CYCLOHEXYLPROPANAL AND PERFUMERY COMPOSITION COMPRISING THE SAME

Junji Koshino; Yoshiaki Fujikura, both of Utsunomiya; Manabu Fujita, Kashiwa, and Nao Toi, Sakura, all of Japan, assignors to Kao Corporation, Tokyo, Japan

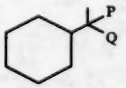
Filed Aug. 29, 1989, Ser. No. 400,018

Claims priority, application Japan, Sep. 1, 1988, 63-219128

Int. Cl.[5] A61K *7/46*

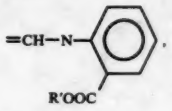
U.S. Cl. 512—21 **4 Claims**

2. A perfumery composition comprising a 2-cyclohexylpropanal derivative represented by the following formula (I):



(I)

wherein P is a hydrogen atom and Q represents a group —CH=N—OH or a group $—CH(OR)_2$, wherein each R represents a C_1–C_3 lower alkyl group or two R's together from a lower alkylene group which may have at least one lower alkyl group which may have at least one lower alkyl substituent wherein the total carbon atom content of two R's is 2–6, or P and Q together form a group



wherein R′ is a C_1–C_2 lower alkyl group and conventional additives.

4,978,654

COMPOSITION AND METHOD FOR TREATMENT OF DISSEMINATED FUNGAL INFECTIONS IN MAMMALS

Gabriel Lopez-Berestein; Victor Fainstein, both of Houston, Tex.; Evan M. Hersh, Tucson, Ariz.; Roy L. Hopfer, Houston, Tex.; Rudolph L. Juliano, Houston, Tex.; Kapil Mehta, Houston, Tex., and Reeta Mehta, Houston, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Continuation-in-part of Ser. No. 600,532, Apr. 16, 1984, Pat. No. 4,663,167. This application Jan. 12, 1987, Ser. No. 2,455

Int. Cl.[5] A61K *31/70, 31/685*

U.S. Cl. 514—31 **11 Claims**

1. A therapeutic agent for treating disseminated fungal infection in a mammal, comprising Amphotericin-B encapsulated within a liposome, the liposome being substantially sterol-free and consisting essentially of one or more compounds selected from the group consisting of phosphoglycerides, phosphatidic acids, and sphingolipids.

4,978,655

USE OF 3′-DEOXYTHYMIDIN-2′-ENE (3′DEOXY-2′,3′-DIDEHYDROTHYMIDINE) IN TREATING PATIENTS INFECTED WITH RETROVIRUSES

Tai-Shun Lin, North Haven, and William H. Prusoff, North Branford, both of Conn., assignors to Yale University, New Haven, Conn.

Filed Dec. 17, 1986, Ser. No. 942,666

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—50 **8 Claims**

1. A method for treating warm blooded animals infected with a retrovirus, the method comprising administering to the warm blooded animal an anti-retroviral effective amount of 3′-deoxythymidin-2′-ene, either alone or in admixture with a diluent or in the form of a medicament.

4,978,656

SYNTHETIC DERIVATIVES OF PARAHERQUAMIDE

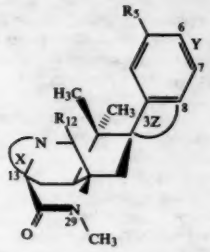
Timothy A. Blizzard, Rahway; Helmut Mrozik, Matawan; Gaye Marino, North Bergen, all of N.J., and Peter J. Sinclair, Suffern, N.Y., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 12, 1988, Ser. No. 231,318

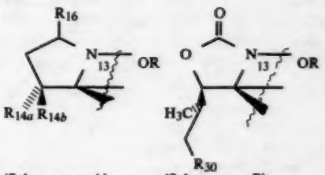
Int. Cl.[5] C07D *491/22;* **A61K** *31/495*

U.S. Cl. 514—63 **26 Claims**

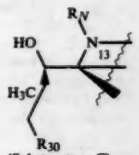
1. A compound having the formula:



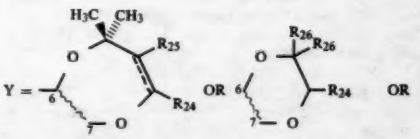
wherein:

X = 

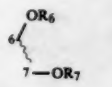
(Substructure A) (Substructure B)



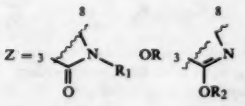
(Substructure C)

Y = 

(Substructure D) (Substructure E)



(Substructure F)

Z = 

(Substructure G) (Substructure H)

R_1 is hydrogen, loweralkyl, lower alkanoyl, or substituted benzenesulfonyl;

R_2 is loweralkyl;

R_5 is hydrogen, halogen, amino, nitro, or loweralkanoylamino;

R_6 is hydrogen, loweralkyl or lower alkanoyl;

R_7 is hydrogen, loweralkyl or lower alkanoyl;

R_{12} is hydrogen or R_{12} can also be oxo provided that R_{16} is hydrogen;

R_{14a} is hydrogen, hydroxy, lower alkoxy, lower alkenyl-

loweralkoxy, lower alkynylloweralkoxy, lower alkanoyloxy, polyalkoxyalkoxy, phenyl, lower alkyl, triloweralkylsilyloxy, diphenylphosphoryloxy, or halogen;

R_{14b} is hydrogen, hdyroxy, lower alkyl, lower alkenyl, phenyl, phenylloweralkyl, lower alkoxy or lower alkanoyloxy;

R_{16} is hydrogen or R_{16} can be oxo provided that R_{12} is hydrogen;

R_{24} is hydrogen, halogen, hydroxy, loweralkoxy, loweralkanoyloxy, or triloweralkylsilyloxy;

R_{25} is hydrogen or halogen;

R_{26} is hydrogen or methyl;

R_{30} is hydrogen, halogen, hydroxy, loweralkoxy, loweralkanoyloxy, hydrazono, semicarbazono;

R_N is hydrogen or lower alkyl; and the broken line represents a single or double bond between carbons 24 and 25; provided that the various R groups are not such that the compounds paraherquamide, 24,25-dihydroparaherquamide, 14-deoxyparaherquamide, and 14-deoxy-14-dimethyl-paraherquamide are defined and the term substitutetd benzenesulfonyl is defined as mono, di, or trilower alkoxy-benzenesulfonyl, or mono, di, or tri-halo-benzenesulfonyl.

4,978,657

NOVEL 11β-SUBSTITUTED-19-NOR-STEROIDS

Jean-Georges Teutsch, Pantin; Vesperto Torelli, Maison-Alfort; Roger Deraedt, Pavilons-sous-Bois; Daniel Philibert, La Varenne-Saint-Hilaire, and Germain Costerousse, Saint-Maurice, all of France, assignors to Roussel Uclaf, Paris, France

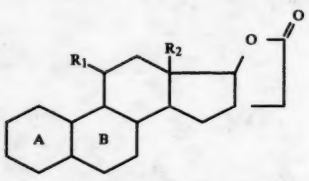
Continuation-in-part of Ser. No. 693,682, Jan. 22, 1985, Pat. No. 4,634,695, and Ser. No. 760,703, Jul. 30, 1985, Pat. No. 4,634,696, said Ser. No. 693,682, is a continuation-in-part of Ser. No. 614,440, May 25, 1984, Pat. No. 4,519,946, which is a division of Ser. No. 595,267, Mar. 30, 1984, abandoned, which is a division of Ser. No. 386,967, Jun. 10, 1982, Pat. No. 4,447,424, which is a continuation-in-part of Ser. No. 338,077, Jan. 8, 1982, Pat. No. 4,386,085, said Ser. No. 760,703, is a division of Ser. No. 501,373, Jun. 6, 1983, Pat. No. 4,547,493. This application Dec. 17, 1985, Ser. No. 810,316

Claims priority, application France, Jan. 9, 1981, 81 00272; Jun. 11, 1982, 82 10205

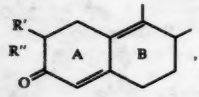
Int. Cl.[5] C07J *33/00;* A61K *31/585*

U.S. Cl. 514—175 **18 Claims**

1. A compound selected from the group consisting of 19-nor-steroids of the formula

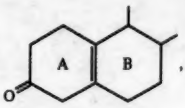


wherein R_1 is an organic group of 1 to 18 carbon atoms containing at least one atom selected from the group consisting of oxygen, sulfur and nitrogen with the atom immediately adjacent the 11-carbon atom being carbon, R_2 is a hydro-carbon 1 to 8 carbon atoms, the A and B rings are selected from the group consisting of

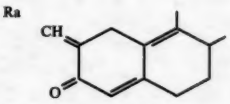


(a)

-continued



(c)



(d)

R′ and R″ are individually selected from the group consisting of hydrogen, —CN and alkyl of 1 to 4 carbon atoms, R_a may be in th E or Z positions as indicated by the wavy line and is selected from the group consisting of

and acyloxy, R'_a and R''_a are alkyl of 1 to 4 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

4,978,658

COMPOSITIONS CONTAINING 5α-DIHYDRO-19-NORETHISTERONE AND DERIVATIVES THEREOF FOR IN VIVO INHIBITION OF AROMATASE

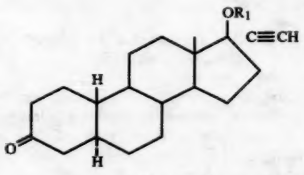
Yoshio Osawa, Buffalo, N.Y., assignor to Medical Foundation of Buffalo, Inc., Buffalo, N.Y.

Continuation of Ser. No. 19,338, Feb. 26, 1987, Pat. No. 4,829,059. This application Oct. 14, 1988, Ser. No. 257,723

Int. Cl.[5] A61K *31/56;* C07J *1/00*

U.S. Cl. 514—178 **14 Claims**

1. A composition for in vivo inhibition of aromatase in a mammal, which comprises an in vivo aromatase inhibitory amount of a compound having the following general formula:



wherein R_1 is C_{1-4} acyl, in combination with a pharmaceutically acceptable carrier or diluent thereof.

4,978,659

2-(HETEROARYLIUMALKYL)PHENYL CARBAPENEM ANTIBACTERIAL AGENTS

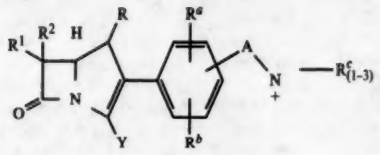
Frank P. DiNinno, Old Bridge; David A. Muthard, Freehold, and Thomas N. Salzmann, North Plainfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 9,865, Feb. 2, 1987, abandoned. This application Aug. 21, 1989, Ser. No. 396,165

Int. Cl.[5] C07D *487/04;* A61K *31/40*

U.S. Cl. 514—210 **14 Claims**

1. A compound of the formula:



(I.)

wherein:

R is H or CH_3;

R^1 and R^2 are independently H, CH_3—, CH_3CH_2—, $(CH_3)_2CH$—, $HOCH_2$—, $CH_3CH(OH)$—, $(CH_3)_2C(OH)$—, $FCH_2CH(OH)$—, $F_2CHCH(OH)$—, $F_3CCH(OH)$—, $CH_3CH(F)$—, CH_3CF_2—, or $(CH_3)_2C(F)$—;

R^a, R^b and R^c (R^c represents from 1 to 3 substituents which may be the same or different and is (are) on the carbon ring atom(s) or nitrogen heteroatom(s), if such is (are) present) are independently selected from the group consisting of:

(a) a trifluoromethyl group: —CF_3;

(b) a halogen atom: —Br, —Cl, —F, or —I;

(c) C_1–C_4 alkoxy radical: —OC_{1-4} alkyl;

(d) a hydroxy group: —OH;

(e) (C_1–C_6 alkyl) carbonyloxy radical:

alkyl;

(f) a carbamoyloxy radical which is unsubstituted or substituted on nitrogen with one or two C_1–C_4 alkyl groups:

where R^y and R^z are independently H or C_{1-4} alkyl;

(g) a C_1–C_6 alkylthio radical, C_1–C_6 alkylsulfinyl radical or C_1–C_6 alkylsulfonyl radical:

alkyl where n=0–2, and the alkyl portion is optionally substituted by cyano;

(h) a sulfamoyl group which is unsubstituted or substituted on nitrogen by one or two C_1–C_4 alkyl groups:

where R^y and R^z are as defined above;

(i) an amino group, or a mono (C_1–C_4 alkyl) amino or di(C_1–C_4 alkyl)amino group:

where R^y and R^z are as defined above;

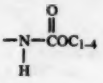
(j) a formylamino group:

(k) (C_1–C_6 alkyl)carbonylamino radical:

alkyl;

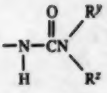
alkyl;

(l) a (C_1–C_4 alkoxy) carbonylamino radical:



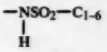
alkyl;

(m) a ureido group in which the terminal nitrogen is unsubstituted or substituted with one or two C_1–C_4 alkyl groups:



where R^y and R^z are as defined above;

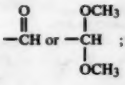
(n) a sulfonamido group:



alkyl;

(o) a cyano group: —CN;

(p) a formyl or acetalized formyl radical:



(q) (C_1–C_6 alkyl) carbonyl radical wherein the carbonyl is free or acetalized:

alkyl or

alkyl;

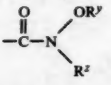
(r) phenylcarbonyl;

(s) a hydroximinomethyl radical in which the oxygen or carbon atom is optionally substituted by a C_1–C_4 alkyl group:

where R^y and R^z are as defined above;
(t) a (C_1–C_6 alkoxy)carbonyl radical:

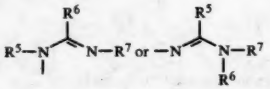
alkyl;
(u) a carbamoyl radical which is unsubstituted or substituted on nitrogen by one or two C_1–C_4 alkyl groups:

where R^y and R^z are as defined above;
(v) an N-hydroxycarbamoyl or N(C_1–C_4 alkoxy)carbamoyl radical in which the nitrogen atom may be additionally substituted by a C_1–C_4 alkyl group:

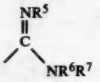


where R^y and R^z are as defined above;
(w) a thiocarbamoyl group:

(x) an amidino group



where R^5, R^6 and R^7 are independently hydrogen, C_1–C_4alkyl or wherein two of the alkyl groups together form a C_2–C_6alkylidene radical optionally interrupted by a heteroatom and joined together to form a ring;
(y) a carboxamidino group



where R^5, R^6 and R^7 are as defined above;
(z) a guanidinyl group where R^6 in (y) above is NR^8R^9 and R^8 and R^9 are as defined for R^5 through R^7 above;
(aa) hydrogen;
(ab) C_2–C_6 alkenyl radical;
(ac) C_2–C_6 alkynyl radical;
(ad) C_3–C_7 cycloalkyl radical;
(ae) C_3–C_7 cycloalkyl methyl radical;
(af) C_5–C_7 cycloalkenyl radical;
(ag) phenyl, except that only R^c may be phenyl;
(ah) C_1–C_6 alkyl radical;
(ai) C_1–C_4 alkyl monosubstituted by one of the substituents (a)–(ag) above;
(aj) an anionic function selected from the group consisting of: phosphono [P=O(OM^c)$_2$]; alkylphosphono {P=O-(OM^c)—[O(C_1–C_4 alkyl)]}; alkylphosphinyl [P=O-(OM^c)—(C_1–C_4alkyl)]; phosphoramido [P=O-(OMc)N(R^y)R^z and P=O(OM^c)NHR^x]; sulfino (SO_2M^c); sulfo (SO_3M^c); acylsulfonamides selected from the structures CONM^{c}SO_2R^x, CONM^{c}SO_2N-(R^y)R^z, SO_2NM^{c}CON(R^y)R^z; and SO_2NM^{c}CN, where

R^x is phenyl or heteroaryl, where heteroaryl is as defined below except that there is no quaternary nitrogen and attachment through nitrogen is optional; and the phenyl and heteroaryl are optionally mono-substituted by R^q; M^c is hydrogen or an alkali metal; R^y and R^z are as defined above; where

R^q is a member selected from the group consisting of —OH; —OCH_3—; —CN; —C(O)NH_2; —OC(O)NH_2; —OC-(O)N(CH_3)$_2$; —SO_2NH_2; —$SO_2N(CH_3)_2$; —$SOCH_3$; —F; —CF_3; tetrazolyl; and —COOM^a, where M^a is hydrogen, alkali metal, methyl or phenyl;

A is para (p) or meta (m) with respect to the point of attachment of the phenyl ring to the carbapenem nucleus, and is $(CH_2)_m$—Q—$(CH_2)_n$, where m is 0 to 2 and n is 1 or 2; and Q is a covalent bond; O; S; SO; SO_2; NH; or N(C_1–C_4 alkyl);

is a monocyclic aromatic hydrocarbon group having 5 or 6 ring atoms in which one of the carbon atoms has been replaced by a nitrogen atom and attachment of said group is by way of said nitrogen atom; and said nitrogen atom is, furthermore, quaternary by virtue of the attachment bond and the ring bonds; and in which one additional carbon atom is optionally replaced by a heteroatom selected from O and S, or from 1 to 3 additional carbon atoms are each optionally replaced by a nitrogen heteroatom selected from O and S, or from 1 to 3 additional carbon atoms are each optionally replaced by a nitrogen heteroatom; and

Y is selected from:
(i) COOH or a pharmaceutically acceptable ester thereof;
(ii) COOM wherein M is an alkali metal or other pharmaceutically acceptable salt;
(iii) COOM wherein M is a negative charge in the case where a permanent positive charge exists elsewhere in the molecule.

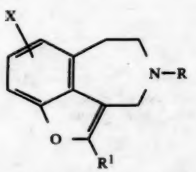
4,978,660

α-ADRENERGIC RECEPTOR ANTAGONISTS

John J. Lafferty, Levittown; Robert M. DeMarinis, Ardmore, and Joseph W. Venslavsky, Wayne, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 200,816, Jun. 1, 1988, abandoned. This application Jun. 6, 1989, Ser. No. 362,122
Int. Cl.^{5} A61K *31/55*; C07D *491/048*
U.S. Cl. 514—215 **19 Claims**

1. A compound represented by the formula:



in which:

X is H, Cl, Br, F, I, CF_3, C_{1-6}alkyl, COR^{10}, CO_2R^{10}, $CONR^{16}R^{11}$, CN, NO_2, $NR^{12}R^{13}$, OR^{12}, SC_{1-4}alkyl,

$S(CH_2)_{0-6}PH$, SCF_3, or any accessible combination thereof of up to three substituents;

R is H, C_{1-6}alkyl, or C_{3-5}alkenyl;

R^1 is W, $(CH_2)_{0-2}CWYZ$, or C_{3-5} alkenyl, except where the double bond is in the 1-position;

R^{10} is C_{1-6}alkyl or $(CH_2)_{0-6}PH$;

R^{11} and R^{16} independently are H, C_{1-6}alkyl, or $(CH_2)_{0-6}PH$;

R^{12} is H, C_{1-6}alkyl, COR^{14}, or SO_2R^{15};

each R^{13} independently is H or C_{1-6}alkyl;

R^{14} and R^{15} independently are C_{1-6}alkyl or $(CH_2)_{0-6}PH$;

W is H, NO_2, C_{1-6}alkyl, CH_2CH_2OH, CN, $C(R^{13})_2(OR^2)$, CH_2SR^2, COR^2, CO_2R^2, $CONR^3R^4$, $SO_2NR^3R^4$, SO_3R^2, SO_2R^5, SOR^5, SR^5, $P(O)(OR^3)(OR^4)$, $P(O)R^5(OR^3)$, $P(O)R^5R^6$, $P(O)(OR^2)NR^3R^4$, $P(O)(NR^3R^4)_2$, $P(O)R^5(NR^3R^4)$, Cl, Br, F, I, CF_3, or $(CH_2)_{0-6}PH$;

Y and Z independently are H or C_{1-6}alkyl;

R^2, R^3, and R^4 independently are H, C_{1-6}alkyl, C_{3-5}alkenyl, or $(CH_2)_{0-6}PH$; and

R^5 and R^6 independently are C_{1-6}alkyl, C_{3-5}alkenyl, or $(CH_2)_{0-6}PH$; where pH represents unsubstituted phenyl or phenyl substituted by up to three substituents selected from C_{1-6}alkyl, C_{1-6}alkoxy, halo, CF_3 or CN; or a pharmaceutically acceptable salt thereof.

19. A method of treating congestive heart failure in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

4,978,661

USE OF 6-HALO-4-QUINOLONE COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS THEREOF FOR THE PREPARATION OF A MEDICAMENT FOR THE THERAPEUTICAL APPLICATION IN RHEUMATOID ARTHRITIS

Innocenzo Caruso, Via Wittgens, 5, 20100 Milan, Italy

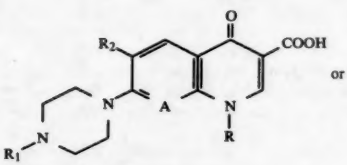
Filed Aug. 11, 1989, Ser. No. 392,475

Claims priority, application Italy, Sep. 29, 1988, 22114 A/88; May 22, 1989, 20585 A/89

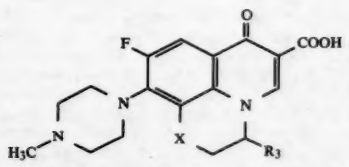
Int. Cl.[5] A61K *31/495*

U.S. Cl. 514—224.5 **7 Claims**

1. A method of treating rheumatoid arthritis, comprising administering to a patient in need thereof, a therapeutically effective amount of a compound of the formula



or



wherein R is ethyl, cyclopropyl, $NHCH_3$ or para-F-phenyl, R_1 is hydrogen or C_{1-2} lower alkyl, R_2 is halogen, A is =CH— or a nitrogen atom, X is oxygen or sulfur, R_3 is methyl when X is oxygen and R_3 is hydrogen when X is sulfur, and pharmaceutically acceptable acid and base addition salts thereof.

4,978,662

2-SUBSTITUTED TRIMETHYLPYRAZINE DERIVATIVES AS INHIBITORS OF PLATELET FUNCTION

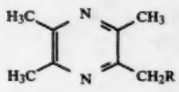
Mark L. Nelson, Sommerville, Mass.; Peter H. Doukas, Newtown; Leon Salganicoff, Philadelphia, both of Pa., and Fiore J. Ricciardi, Milwaukee, Wis., assignors to Temple University of the Commonwealth System of Higher Education, Philadelphia, Pa.

Filed Apr. 11, 1989, Ser. No. 336,261

Int. Cl.[5] A61K *31/495, 31/335;* **C07D** *241/12*

U.S. Cl. 514—235.8 **22 Claims**

6. A method for inhibiting blood platelet aggregation in mammals which comprises administering to such mammals an amount of a compound of the formula



wherein R is selected from the group consisting of alkylamino containing from 1 to 4 carbon atoms, 4-methyl-1-piperazinyl, piperidino, morpholino and 2-trimethylpyrazinepropenyl, said amount being effective to inhibit blood platelet aggregation.

4,978,663

5-(1-AMINOCYCLOHEXYL)-2(1H)-PYRIDINONE COMPOUNDS WHICH HAVE PHARMACEUTICAL UTILITY

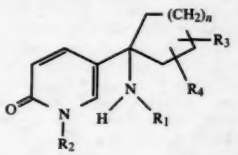
Richard C. Effland, Bridgewater, N.J., and David M. Fink, Doylestown, Pa., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Aug. 16, 1989, Ser. No. 394,448

Int. Cl.[5] A61K *31/44;* **C07D** *211/80*

U.S. Cl. 514—231.8 **27 Claims**

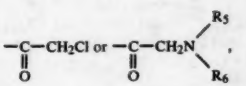
1. A compound having the formula,



where

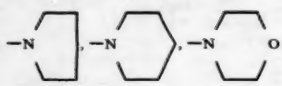
n is 1, 2 or 3;

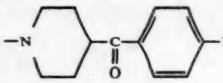
R_1 is hydrogen, formyl, loweralkylcarbonyl, arylloweralkylcarbonyl, loweralkyl, arylloweralkyl,



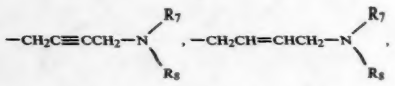
R_5 and R_6 being independently loweralkyl or alternatively the group

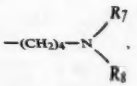
taken as a whole is





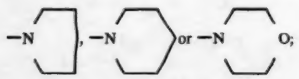
R_2 is hydrogen, loweralkyl, loweralkenyl, aryllowerealkyl, $-CH_2C{\equiv}CH$,





R_7 and R_8 being independently loweralkyl or alternatively the group

taken as a whole is



R_3 is hydrogen or loweralkyl; and
R_4 is hydrogen or loweralkyl;

the term aryl in each occurrence signifying a phenyl group optionally mono-substituted with a loweralkyl, loweralkoxy, halogen or trifluoromethyl group; or a pharmaceutically acceptable acid addition salt thereof.

26. A method of treating a patient in need of relief from pain which comprises administering to such a patient an effective amount of a compound as defined in claim 1.

27. A method of treating a patient in need of relief from a memory dysfunction which comprises administering to such a patient an effective amount of a compound as defined in claim 1.

4,978,664

3-ARYLCARBONYL- AND 3-CYCLOALKYL-CARBONYL-1-AMINOALKYL-1H-INDOLE PHARMACEUTICAL COMPOSITIONS

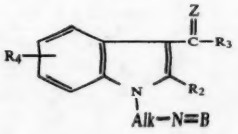
Malcolm R. Bell, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 255,305, Oct. 11, 1988, Pat. No. 4,885,295, which is a continuation of Ser. No. 928,335, Nov. 18, 1986, abandoned, which is a division of Ser. No. 810,942, Dec. 19, 1985, Pat. No. 4,634,776, which is a continuation of Ser. No. 755,239, Jul. 15, 1985, Pat. No. 4,581,354, which is a continuation-in-part of Ser. No. 637,931, Aug. 6, 1984, abandoned. This application Sep. 20, 1989, Ser. No. 409,913

Int. Cl.[5] A61K *31/40, 31/535*

U.S. Cl. 514—235.2 5 Claims

1. An analgesic, anti-rheumatic or anti-inflammatory composition for relief of pain or rheumatic or inflammatory conditions which comprises a pharmaceutically acceptable carrier and, as the active component thereof, an effective analgesic, anti-rheumatic or anti-inflammatory amount of a compound having the formula;



wherein:

R_2 is hydrogen, lower-alkyl, chloro, phenyl or benzyl (or phenyl or benzyl substituted by from one to two substituents selected from halo, lower-alkyl, lower-alkoxy, hydroxy, amino, lower-alkylmercapto, lower-alkylsulfinyl or lower-alkylsulfonyl);

R_3 is cyclohexyl, lower-alkoxycyclohexyl, phenyl (or phenyl substituted by from one to two substituents selected from halo, lower-alkoxy, hydroxy, benzyloxy, lower-alkyl, nitro, amino, lower-alkylamino, di-lower-alkylamino, lower-alkoxy-lower-alkylamino, lower-alkanoylamino, benzoylamino, trifluoroacetylamino, lower-alkyl-sulfonylamino, carbamylamino, lower-alkylmercapto, lower-alkylsulfinyl, lower-alkylsulfonyl, cyano, formyl or oximinomethylene), methylenedioxyphenyl, 3- or 4-hydroxy-1-piperidinylphenyl, 1-piperazinylphenyl, (1H-imidazol-1-yl)phenyl, (1-pyrrolyl)phenyl, aminomethylphenyl, guanidinylmethylphenyl, N-cyanoguanidinylmethylphenyl, styryl, lower-alkyl-substituted styryl, fluoro-substituted-styryl, 2- or 4-biphenyl, 1- or 2-naphthyl (or 1- or 2-naphthyl substituted by from one to two substituents selected from lower-alkyl, lower-alkoxy, hydroxy, bromo, chloro, fluoro, lower-alkoxycarbonyl, carbamyl, cyano, lower-alkylmercapto, lower-alkylsulfinyl, lower-alkylsulfonyl or trifluoromethyl), thienyl, furyl, benzo[b]furyl, benzo[b]thienyl, quinolyl or (N-lower-alkyl)pyrrolyl;

R_4 is hydrogen or from one to two substituents selected from lower-alkyl, hydroxy, lower-alkoxy or halo in the 4-, 5-, 6- or 7-positions;

C═Z is C═O or C═NOH;

Alk is α,ω-lower-alkylene having the formula $(CH_2)_n$ where n is an intger from 2 to 6, or such lower-alkylene substituted on the α- or the ω-carbon atom by a lower-alkyl group; and

N═B is azido, amino, N-lower-alkylamino, N,N-di-lower-alkylamino, N-(hydroxy-lower-alkyl)amino, N,N-di-(hydroxy-lower-alkyl)amino, N-lower-alkyl-N-(hydroxy-lower-alkyl)amino, N-(lower-alkoxy-lower-alkyl)amino, N-(halo-n-propyl)amino, 4-morpholinyl, 2-lower-alkyl-4-morpholinyl, 2,6-di-lower-alkyl-4-morpholinyl, 4-thiomorpholinyl, 4-thiomorpholinyl-S-oxide, 4-thiomorpholinyl-S,S-dioxide, 1-piperidinyl, 3- or 4-hydroxy-1-piperidinyl, 3- or 4-lower-alkanoyloxy-1-piperidinyl, 3- or 4-amino-1-piperidinyl, 3- or 4-(N-lower-alkanoylamino)-1-piperidinyl, 2-cyclohexyl-methyl-1-piperidinyl, 1-pyrrolidinyl, 3-hydroxy-1-pyrrolidinyl, 1-azetidinyl, 1-piperazinyl, 4-lower-alkyl-1-piperazinyl, 4-lower-alkanoyl-1-piperazinyl, 4-carbo-lower-alkoxy--1-piperazinyl, hexahydro-4H-1,4-diazepin-4-yl or the N═B N-oxides thereof; or an acid-addition salt thereof.

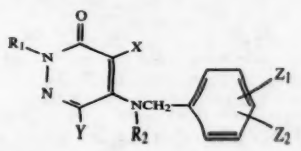
4,978,665

3(2H)PYRIDAZINONE, AND ANTAGONISTIC AGENT AGAINST SRS-A CONTAINING IT

Keizo Tanikawa; Ryozo Sakoda, both of Funabashi; Ken-ichi Shikada, and Sakuya Tanaka, both of Shiraoka, all of Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

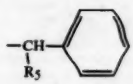
Filed Jan. 15, 1988, Ser. No. 144,173
Claims priority, application Japan, Jan. 20, 1987, 62-10231
Int. Cl.[5] C07D 237/22; A61K 31/50
U.S. Cl. 514—247 29 Claims

1. A 3(2H)pyridazinone of the formula:

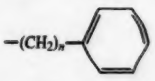


(I)

wherein R_1 is hydrogen, 2-propenyl or straight chained or branched C_1–C_4 alkyl; R_2 is hydrogen or C_1–C_3 alkyl; X is chlorine or bromine; Y is nitro, —NHR_3 wherein R_3 is hydrogen or straight chained or branched C_1–C_4 alkyl, —AR_4 wherein A is oxygen or sulfur and R_4 is hydrogen, straight chained or branched C_1–C_6 alkyl, C_3–C_6 alkenyl having one double bond, C_3–C_6 alkynyl having one triple bond, phenyl or



wherein R_5 is hydrogen or C_1–C_4 alkyl, or halogen; Z_1 is hydrogen, C_1–C_4 alkyl, —OR_6 wherein R_6 is hydrogen, straight chained or branched C_1–C_8 alkyl or



wherein n is an interger of from 1 to 4, —$N(R_7)_2$ wherein R_7 is C_1–C_4 alkyl, or halogen; Z_2 is C_1–C_4 alkyl, —OR_6 wherein R_6 is as defined above, —$N(R_7)_2$ wherein R_7 is as defined above, or halogen, provided that when R_1 is straight chained or branched C_2–C_4 alkyl, Y is not hydrogen and when R_1 is hydrogen, methyl or 2-propenyl, Y and R_2 are not simultaneously hydrogen, or a pharmaceutically acceptable salt thereof.

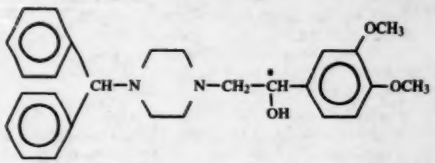
4,978,666

OPTICALLY ACTIVE PIPERAZINE DERIVATIVE

Hiroyuki Nohira, Saitama; Mitsuo Masaki, Chiba, and Masao Yamamoto, Saitama, all of Japan, assignors to Nippon Chemiphar Co., Ltd., Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,658
Claims priority, application Japan, Aug. 5, 1988, 63-196427
Int. Cl.[5] A61K 31/495; C07D 295/08
U.S. Cl. 514—255 4 Claims

1. A (−)-optically active piperazine compound of the formula:



wherein the mark of * indicates an optically active carbon.

4. A method for improving cerebral circulation in mammals which comprising administering to a mammal a cerebral circulation effective amount of the compound of claim 1.

4,978,667

SUBSTITUTED 6H-7,8-DIHYDROTHIAPYRANO(3,2-D)-PYRIMIDINES AS HYPOGLYCEMIC AGENTS

Richard Saperstein, Edison; Richard L. Tolman, Warren, and Eve E. Slater, Short Hills, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 941,477, Dec. 15, 1986, abandoned.
This application Sep. 12, 1988, Ser. No. 242,766
Int. Cl.[5] A61K 31/505
U.S. Cl. 514—258 2 Claims

1. A method for lowering the blood glucose levels of diabetic or insulin resistant obese patients which comprises orally administering to said patients an effective amount of the compound 7,8-Dihydro-2-methyl-4(4-methyl-1-piperazinyl)6H-thiapyranno(3,2-D)pyrimidine.

4,978,668

TREATMENT TO REDUCE ISCHEMIC TISSUE INJURY

Charles F. Babbs, and Stephen F. Badylak, both of West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Sep. 2, 1986, Ser. No. 902,703
Int. Cl.[5] A61K 31/505
U.S. Cl. 514—258 20 Claims

1. A method for treatment of a patient suffering an unanticipated condition of body tissue ischemia due to a stoppage of the inflow of arterial blood to said tissue to reduce tissue damage upon reperfusion of the tissue, said method consisting essentially of administering intravenously to said patient a therapeutically effective amount of a compound selected from the group consisting of effective amount of a compound selected from the group allopurinol, oxypurinol, and alkali metal salts of allopurinol and oxypurinol, the administration of said compound being initiated subsequent to the occurrence of the condition of body tissue ischemia and substantially simultaneously with resumption of blood flow to said tissues.

4,978,669

METHOD OF SUPPRESSING APPETITE BY ADMINISTRATION OF TETRAHYDRO-BETA-CARBOLINE DERIVATIVES

Jack D. Barchas, Stanford; Glen R. Elliott, Sunnyvale; Peter I. Adriaenssens, Palo Alto; Robert S. Bitner, Mountain View; Stephen S. Bowersox, Menlo Park, and Laszlo Nadasdi, San Francisco, all of Calif., assignors to Neurex Corporation, Menlo Park, Calif.

Filed Jun. 8, 1989, Ser. No. 363,504
Int. Cl.[5] A61K 31/44
U.S. Cl. 514—292 2 Claims

1. A method for altering macronutrient preference in a mammal, which comprises:

administering to a mammal in need thereof an appetite altering amount of a compound selected from the group consisting of:

6-methyl-1,2,3,4-tetrahydro-[beta]β-carboline,
6-methyl-9-pentyl-1,2,3,4-tetrahydro-[beta]β-carboline,
3-carboxy-1,2,3,4-tetrahydro-[beta]β-carboline,
1-carboxy-1,2,3,4-tetrahydro-[beta]β-carboline,
2-acetyl-1,2,3,4-tetrahydro-[beta]β-carboline,
5-methyl-1,2,3,4-tetrahydro[beta]β-carboline,
9-benzyl-1,2,3,4-tetrahydro-[beta]β-carboline,
9-ethyl-1,2,3,4-tetrahydro-[beta]β-carboline,
3-carbobenzyloxy-1,2,3,4-tetrahydro-[beta]β-carboline,
1-carboxamido-1,2,3,4-tetrahydro-[beta]β-carboline,
3-carboxamido-1,2,3,4-tetrahydro-[beta]β-carboline, and
9-pentyl-1,2,3,4-tetrahydro-[beta]β-carboline.

4,978,670

ANTHELMINTIC QUATERNARYALKYL ACYLHYDRAZONES, METHOD OF USE AND COMPOSITIONS

Douglas L. Rector; George A. Conder, and Sylvester D. Folz, all of Kalamazoo City, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

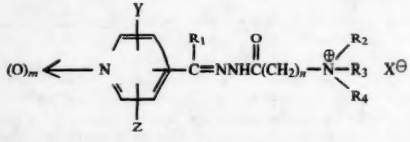
PCT No. PCT/US87/00697, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO87/06132, PCT Pub. Date Oct. 22, 1987

Continuation-in-part of Ser. No. 849,039, Apr. 7, 1986, abandoned. This PCT application Apr. 3, 1987, Ser. No. 312,776

Int. Cl.[5] A61K *31/44;* C07D *213/89, 213/40*

U.S. Cl. 514—345 8 Claims

1. A method of killing parasitic worms in humans and valuable warm-blooded domestic animal which comprises administering to humans or valuable warm-blooded domestic animals in need, a therapeutic or prophylactic dosage of a pyridinyl quaternaryalkyl acylhydrazone, hydrate thereof, or pharmaceutically acceptable salt thereof of the formula IA:



wherein X and Y, being the same or different, are selected from hydrogen, hydroxy, C_1–C_4 alkyl, C_1–C_3 alkoxy, C_1–C_3 alkylthio, halo or trifluoromethyl; with the proviso that only X or Y is hydroxy;

wherein R_1 is hydrogen; C_1–C_4 alkyl; cyclo(C_3–C_6)alkyl optionally substituted with one, 2 or 3 C_1–C_3 alkyl; phenyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy; phenyl(C_1–C_3)alkyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy, or 1,3-dioxacyclohexan-5-yl;

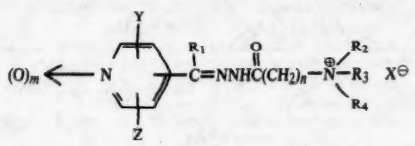
wherein n is 1–4;

wherein m is 0 or 1;

wherein R_2, R_3 and R_4 are taken together with the nitrogen to form pyridinyl optionally substituted with phenyl and/or one or two C_1–C_4 alkyl or C_1–C_4 alkoxy;

and X is a pharmaceutically acceptable anion.

8. An anthelmintic composition for administration to animals comprising a physiologically acceptable carrier and adjuvants, and at least an effective anthelmintic amount of a pyridinyl quaternaryalkyl acylhydrazone, hydrate thereof or pharmaceutically acceptable salt thereof of the formula IA



wherein X and Y, being the same or different, are selected from hydrogen, hydroxy, C_1–C_4 alkyl, C_1–C_3 alkoxy, C_1–C_3 alkylthio, halo or trifluoromethyl; with the proviso that only *X or Y is hydroxy;*

wherein R_1 is hydrogen; C_1–C_4 alkyl; cyclo(C_3–C_6)alkyl optionally substituted with one, 2 or 3 C_1–C_3 alkyl; phenyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy; phenyl(C_1–C_3)alkyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, halo, trifluoromethyl, or C_1–C_3 alkoxy, or 1,3-dioxacyclohexan-5-yl;

wherein n is 1–4;

wherein m is 0 or 1;

wherein R_2, R_3 and R_4 are taken together with the nitrogen to form pyridinyl optionally substituted with phenyl and/or one or two C_1–C_4 alkyl or C_1–C_4 alkoxy;

and X is a pharmaceutically acceptable anion.

4,978,671

THIENO (3',4'-4,5)IMIDAZO(2,1-b)THIAZOLE DERIVATIVES, A PROCESS FOR THEIR PREPARATION AND THEIR USE IN MEDICAMENTS

Dieter Binder, Wien; Franz Rovenszky, Bruck a. d. Leitha, and Hubert P. Ferber, Ansfelden, all of Austria, assignors to Chemisch Pharmazeutische Forschungsgesellschaft m.b.H., Linz, Austria

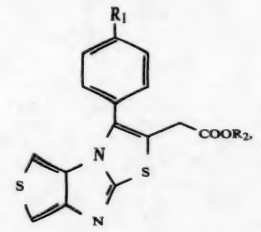
Filed Aug. 30, 1989, Ser. No. 401,135

Claims priority, application Austria, Sep. 8, 1988, 2202/88

Int. Cl.[5] C07D *513/14;* A01K *31/425*

U.S. Cl. 514—366 5 Claims

1. A compound of the formula



I

in which R_1 denotes hydrogen, halogen or CF_3 and R_2 denotes hydrogen or C_1–C_4 alkyl and, in the case in which R_2 denotes hydrogen, their pharmaceutically utilizable salts.

4,978,672

ALPHA-HETEROCYCLC SUBSTITUTED TOLUNITRILES

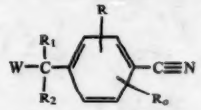
Robert M. Bowman, Summit; Ronald E. Steele, Long Valley, both of N.J., and Leslie Browne, Aesch, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 164,696, Mar. 7, 1988, Pat. No. 4,937,250, which is a division of Ser. No. 837,489, Mar. 7, 1986, Pat. No. 4,749,713. This application Sep. 6, 1988, Ser. No. 240,862

Int. Cl.[5] A61K *31/41;* C07D *249/08*

U.S. Cl. 514—383 18 Claims

1. A compound of the formula



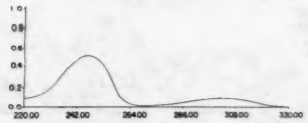
wherein R and R_o represent hydrogen or lower alkyl; or R and R_o located on adjacent carbon atoms and together when combined with the benzene ring to which they are attached form a naphthalene or tetrahydronaphthalene ring; R_1 represents hydrogen; R_2 represents hydrogen, lower alkyl, (lower alkyl, aryl or aryl-lower alkyl)-thio, lower alkenyl, aryl, aryl-lower alkyl, C_3–C_6-cycloalkyl, or C_3–C_6-cycloalkyl-lower alkyl; or R_1 and R_2 combined represent lower alkylidene, mono- or di-aryl-lower alkylidene; R_1 and R_2 combined also represent C_4–C_6-straight chain alkylene, lower alkyl-substituted straight chain alkylene or CH_2-ortho-phenylene-CH_2; W represents 1-(1,2,4- or 1,3,4))-triazolyl or 1-(1,2,4 or 1,3,4-triazolyl substituted by lower alkyl; aryl within the above definitions represents phenyl or phenyl substituted by one or two substituents selected from lower alkyl, lower alkoxy, hydroxy, lower alkanoyloxy, aroyloxy, nitro, amino, halogen, trifluoromethyl, cyano, carboxy, carboxy funtionalized in form of a pharmaceutically acceptable ester or amide, lower alkanoyl, aroyl, lower alkylsulfonyl, sulfamoyl, N-lower alkylsulfamoyl or N,N-di-lower alkylsulfamoyl; and aryl within the above definitions also represents 2-, 3-, or 4-pyridyl or a said heterocyclic radical monosubstituted by lower alkyl, lower alkoxy, cyano or halogen; and aroyl within the above definitions represents benzoyl or benzoyl substituted by lower alkyl, lower alkoxy, halogen or trifluoromethyl; or a pharmaceutically acceptable salt thereof.

4,978,673

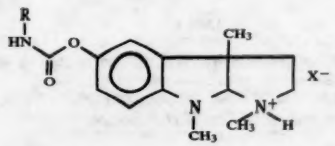
ORGANIC SALTS OF PHYSOSTIGMINE DERIVATIVES

Carlo Meroni, Meda; Stefano Maiorana, Milan; Mario Brufani; Massimo Pomponi, both of Rome; Riccardo Bernardi, Artigliano; Pier L. Rugarli, Milan, and Pier G. Pagella, Isola S. Antonio, all of Italy, assignors to Mediolanum Farmaceutici S.r.l. Consiglio Nazionale Delle Ricerch, Italy

Filed Mar. 28, 1988, Ser. No. 172,799
Claims priority, application Italy, Apr. 3, 1987, 19964 A/87
Int. Cl.[5] C07D 487/00; A61K 31/40
U.S. Cl. 514—411 **11 Claims**



1. Organic salts of physostigmine derivatives, having the following general formula:



(I)

in which R is a linear or branched C_2–C_{12} alkyl or a cycloalkyl, and X− is he anion of an organic acid.

5. A pharmaceutical composition having acetylcholinesterase inhibition properties, wherein the active ingredient is an effective amount of an organic salt of physostigmine derivatives according to claim 1.

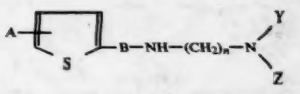
4,978,674

DAIMINE DERIVATIVES, AND METHOD OF MANUFACTURING THE SAME

Tsuyoshi Tomiyama; Akira Tomiyama, both of Sakaki; Shuichi Wakabayshi, Koushoku; Hironao Sajiki, Sakaki, and Junko Sekiguchi, Ueda, all of Japan, assignors to Kotobuki Seiyaku Co. Ltd., Nagano, Japan

Filed Aug. 2, 1989, Ser. No. 389,050
Claims priority, application Japan, Sep. 21, 1988, 63-236885
Int. Cl.[5] A61K 31/38; C07D 333/32
U.S. Cl. 514—445 **9 Claims**

1. A compound of the formula:



wherein:

A is $—NO_2$, $—SO_2—R$ or —NH—SO_2—R wherein R represents a lower alkyl group;

B is $>CH_2$ or $>CO$;

Y is a lower alkyl group;

Z is a lower alkyl or benzyl group and n represents 2 or 3, and

pharmaceutically acceptable acid addition salts thereof.

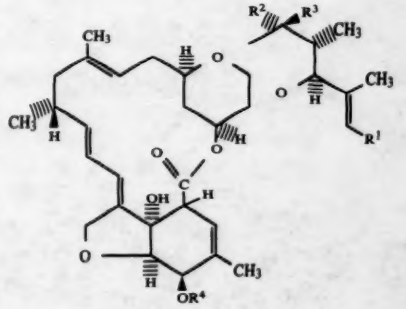
4,978,675

MACROLIDE ANTIBIOTICS AND THEIR PREPARATION

John B. Ward, Bushey; Hazel M. Noble, Burnham; Neil Porter, Pinner; Richard A. Fletton, Ruislip; David Noble, Burnham; Derek R. Sutherland, Chalfont St Giles, and Michael V. J. Ramsay, South Harrow, all of England, assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 855,450, Apr. 24, 1986, abandoned.
This application Nov. 10, 1987, Ser. No. 119,347
Claims priority, application United Kingdom, Apr. 30, 1985, 8510942; Apr. 30, 1985, 8510943; Apr. 30, 1985, 8510944; Mar. 12, 1986, 8606103
Int. Cl.[5] A61K 31/335; C07D 313/00
U.S. Cl. 514—450 **27 Claims**

1. A compound of formula (II)



wherein

R^1 is a methyl, ethyl or isopropyl group;

R^2 is a hydrogen atom or a group OR^5 and R^3 represents a hydrogen atom, or R^2 and R^3 together with the carbon atom to which they are attached represent a $>C=O$ group;

OR^5 is —OH, —$OCOR^6$, where R^6 is C_{1-8} alkyl optionally substituted by halo, C_{1-4} alkoxy, phenoxy or phenyl, C_{3-6} cycloalkyl or phenyl; —OCO_2R^{6a}, where R^{6a} is C_{1-4} alkyl optionally substituted by halop; —$OCSOR^{6b}$, where R^{6b} is phenyl optionally substituted by C_{1-4} alkyl; —$OR^7$where R^7 is C_{1-4} alkyl optionally substituted by C_{3-5} cycloalkyl, C_{3-5} cycloalkyl or C_{3-5} alkenyl; —OSO_2R^8, where R^8 is C_{1-4} alkyl or phenyl optionally substituted by C_{1-4} alkyl; or —$OCO(CH_2)_nCO_2R^9$, where R^9 is a hydrogen atom or a C_{1-4} alkyl group and n represents zero, 1 or 2; and

OR^4 is —OH, —$OCOR^{4a}$, where R^{4a} is C_{1-4} alkyl, optionally substituted by halo, phenoxy, or tri(C_{1-4} alkyl)silyloxy, phenyl or halophenyl; —$OCO(CH_2)_nCO_2R^9$, where R^9 is a hydrogen atom or a C_{1-4} alkyl group and n represents zero, 1 or 2; —OCO_2R^{4b}, where R^{4b} is C_{1-4} alkyl optionally substituted by phenyl or halo; C_{1-4} alkoxy; or tri(C_{1-4} alkyl)silyloxy;

excluding the compounds in which R^2 is —OH and OR^4 is —OH or OCH_3.

4,978,676

TREATMENT OF SKIN DISEASES WITH ARTEMISININ AND DERIVATIVES

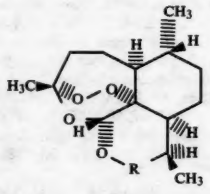
Carl R. Thornfeldt, 1054 NW. 2nd Ave., Ontario, Oreg. 97914

Continuation-in-part of Ser. No. 280,765, Dec. 6, 1988, abandoned, which is a continuation of Ser. No. 85,629, Aug. 24, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 335,615

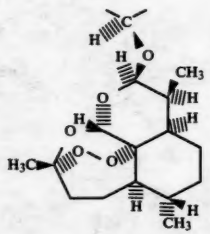
Int. Cl.[5] A61K *31/335*

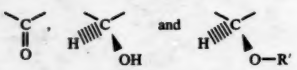
U.S. Cl. 514—450 **6 Claims**

1. A method for the treatment of a subject suffering from psoriasis, said method comprising administering to said subject a therapeutically effective amount of a compound having the formula

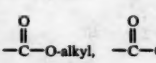


in which R is a member selected from the group consisting of

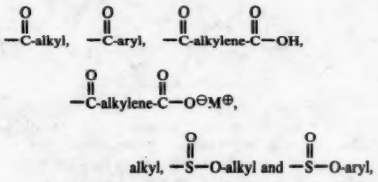




where R' is a member selected from the group consisting of



-continued



in which M is sodium or potassium.

4,978,677

C(29)-CARBONYLOXYMILBEMYCIN DERIVATIVES FOR CONTROLLING PARASITIC PETS OF ANIMALS AND PLANTS

Jean-Claude Gehret, Aesch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

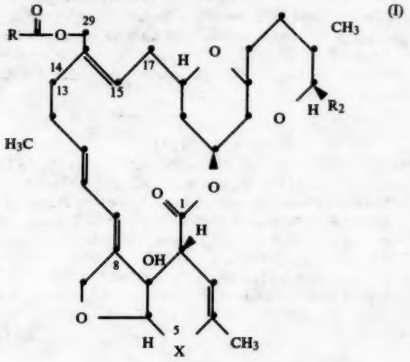
Continuation of Ser. No. 22,198, Mar. 5, 1987, abandoned. This application Nov. 6, 1989, Ser. No. 432,297

Claims priority, application Switzerland, Mar. 6, 1986, 918/86

Int. Cl.[5] A61K *31/365;* **C07D** *493/22*

U.S. Cl. 514—450 **5 Claims**

1. A compound of formula I



(I)

wherein

X is —$CH(OR_1)$—,

R_1 is hydrogen,

R_2 is ethyl, and

R is t-butyl.

3. A method of controlling pests, which method comprises applying or administering to the host animals or applying to the host plants or to other loci of said pests a pesticidally effective amount of the compound of claim 1.

4,978,678

12-HALOGENATED FORSKOLIN DERIVATIVES

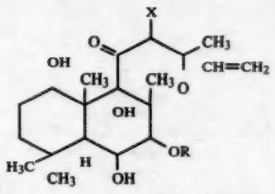
Gregory M. Shutske, Somerset, N.J., assignor to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 932,553, Nov. 20, 1986, Pat. No. 4,871,764. This application Aug. 7, 1989, Ser. No. 390,126

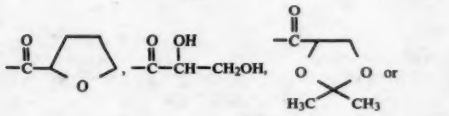
Int. Cl.[5] A61K *31/35;* **C07D** *311/92*

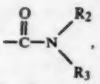
U.S. Cl. 514—455 **20 Claims**

15. A method of reducing intraocular pressure in mammals comprising administering to a mammal requiring intraocular pressure reduction an effective intraocular pressure reducing amount of a compound of the formula



wherein X is F, Cl, Br or I; R is





where R_2 and R_3 are the same or different and are hydrogen or a lower alkyl; or an optical or geometric isomer thereof.

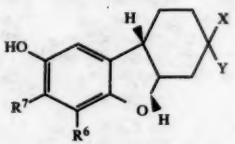
4,978,679

6- AND/OR 7-SUBSTITUTED-1,2,3,4,4A,9B-HEXAHYDRO-8-HYDROXYDIBENZOFURAN-3-OLS AS INHIBITORS OF LEUKOTRIENE BIOSYNTHESIS

Kathleen M. Rupprecht, Cranford, N.J., and Joshua S. Boger, Concord, Mass., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 25, 1989, Ser. No. 411,787
Int. Cl.[5] A61K *31/34*; C07D *307/91*
U.S. Cl. 514—468 **11 Claims**

1. A compound of Formula I wherein:



I

R^6 is:
(C_1–C_6)-straight or branched chain alkyl or
(C_2–C_6)-alkenyl; and
hydrogen, when R^7 is not hydrogen;
R^7 is:
hydrogen,
(C_1–C_6)-straight or branched chain alkyl or
(C_2–C_6)-alkenyl; and
X and Y together are a keto group, or
X and Y are different and are independently H, OH, (C_1–C_6)-alkyl, or phenyl, except that if X or Y is (C_1–C_6)-alkyl, then Y or X cannot be phenyl,
or pharmaceutically acceptable salts thereof.

4,978,680

METHOD FOR THE PREVENTION AND CONTROL OF EPILEPTIC SEIZURE

Robert D. Sofia, Willingboro, N.J., assignor to Carter-Wallace, Inc., New York, N.Y.

Filed Sep. 26, 1989, Ser. No. 412,964
Int. Cl.[5] A61K *31/24*
U.S. Cl. 514—534 **1 Claim**

1. A method for reducing the incidence and severity of epileptic seizures which comprises administering to a warm-blooded animal in need of such treatment a therapeutic amount of 2-phenyl-1,3-propanediol dicarbamate.

4,978,681

HAIR-GROWING AGENT

Kuniaki Adachi, Odawara; Hideo Tamai, Ninomiya, and Masanao Sadai, Hiratsuka, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Division of Ser. No. 923,902, Oct. 28, 1986, Pat. No. 4,874,791, which is a continuation of Ser. No. 724,354, Apr. 18, 1985, abandoned, which is a continuation of Ser. No. 518,447, Jul. 29, 1983, abandoned. This application Aug. 16, 1988, Ser. No. 232,770
Claims priority, application Japan, Aug. 10, 1982, 57-137909
The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.
Int. Cl.[5] A61K *31/19, 31/20*
U.S. Cl. 514—557 **10 Claims**

1. A method of stimulating growth of human hair on a human head suffering from or susceptible to alopecia which comprises bringing active human hair follicles on a human head from a telogen state into a normal anagen state by applying to said follicles a growth stimulating amount of an effective ingredient which is an aliphatic carboxylic acid which possesses an odd number of carbon atoms or a derivative thereof and is selected from the group consisting of n-propionic acid, n-valeric acid, n-heptanoic acid, n-nonanoic acid, a glyceride of said acids, a metal salt of said acids and mixtures thereof.

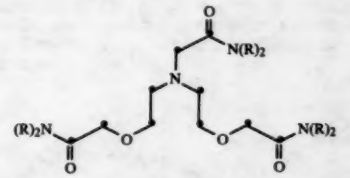
4,978,682

NOVEL DIETHANOLAMINE TRIACETIC ACID TRIAMIDES AND METHODS FOR IMPROVING FEED UTILIZATION AND LACTATION IN RUMINANT ANIMALS

Alan W. White, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

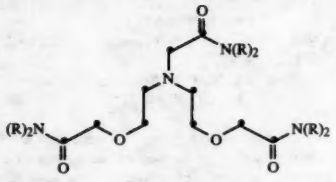
Division of Ser. No. 262,375, Oct. 25, 1988, Pat. No. 4,882,355, which is a division of Ser. No. 81,064, Aug. 3, 1987, Pat. No. 4,800,213. This application Sep. 18, 1989, Ser. No. 408,854
Int. Cl.[5] C07C *103/50*; A61K *31/16*
U.S. Cl. 514—616 **10 Claims**

1. A compound having the formula:



wherein each R may be the same or different and represents a straight or branched chain alkyl group of one to six carbon atoms,
or the physiologically acceptable salts thereof.

5. A composition useful for increasing the efficiency of feed utilization by ruminant animals comprising an effective amount of one or more compounds having the formula:



wherein each R may be the same or different and represents a straight or branched chain alkyl group of one to six carbon atoms;

or the physiologically acceptable salts thereof;

and an inert carrier.

4,978,683

PROGLUMIDE AND PHARMACEUTICAL COMPOSITIONS CONTAINING IT FOR USE IN THE TREATMENT OF NEOPLASTIC AFFECTIONS

Angelo L. Rovati; Claudio L. Rovati, both of San Fruttuoso di Monza, and Francesco Makovec, Monza, all of Italy, assignors to Rotta Research Laboratorium S.p.A., Milan, Italy

PCT No. PCT/EP85/00673, § 371 Date Aug. 13, 1986, § 102(e) Date Aug. 13, 1986, PCT Pub. No. WO86/03968, PCT Pub. Date Jul. 17, 1986

PCT Filed Dec. 5, 1985, Ser. No. 900,152

Claims priority, application Italy, Dec. 27, 1984, 68281 A/84

Int. Cl.[5] A61K *31/165*

U.S. Cl. 514—617 **2 Claims**

1. A method of treatment of malignant tumors whose growth is increased by bioactive polypeptides comprising administering an anti-tumor effective amount of proglumide or a pharmaceutically-acceptable salt thereof to a human patient afflicted with said malignant tumors, wherein said malignant tumors are of pancreatic, colic or gastric origin.

4,978,684

METHOD AND AGENTS FOR PREVENTING STAINING OF TEETH

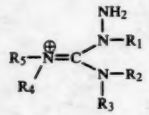
Anthony Cerami, Shelter Island, and Michael A. Yamin, New York, both of N.Y., assignors to The Rockefeller University, New York, N.Y.

Continuation-in-part of Ser. No. 119,958, Nov. 13, 1987, Pat. No. 4,908,446, which is a continuation-in-part of Ser. No. 798,032, Nov. 14, 1985, Pat. No. 4,758,583, which is a continuation-in-part of Ser. No. 590,820, Mar. 19, 1984, Pat. No. 4,665,192. This application Jan. 29, 1988, Ser. No. 149,726

Int. Cl.[5] A01N *37/52*

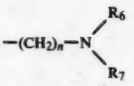
U.S. Cl. 514—632 **12 Claims**

1. A method of inhibiting the discoloration of teeth resulting from nonenymatic browning in the oral cavity which comprises administration to a subject in need of such therapy an amount effective to inhibit the formation of advanced glycosylation end products of a composition comprising an agent selected from the group consisting of aminoguanidine derivatives having the structural formula



(I)

wherein R_1 is hydrogen or a lower alkyl group of 1–6 carbon atoms or a hydroxyethyl group; R_2 is hydrogen or a lower alkyl group of 1–6 carbon atoms, amino, hydroxy, or an aminoalkylene group of the formula



wherein n is an integer of 2–7 and R_6 and R_7 are independently a lower alkyl group of 1–6 carbon atoms; R_3 is hydrogen or a lower alkyl group of 1–6 carbon atoms; R_4 is hydrogen, a lower alkyl group of 1–6 carbon atoms, or an amino group; R_5 is hydrogen, or a lower alkyl group of 1–6 carbon atoms; with the proviso that at least one of R_1, R_2, R_3, R_4 or R_5 is other than hydrogen; and their pharmaceutically acceptable acid addition salts, and mixtures thereof.

4,978,685

CONTROL OF BIOFOULING IN AQUEOUS SYSTEMS BY NON-POLYMERIC QUATERNARY AMMONIUM POLYHALIDES

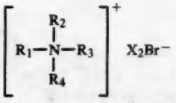
James E. Gannon, Cleveland, Minn., and Scott Thornburgh, West Lafayette, Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Continuation of Ser. No. 48,902, Apr. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 911,183, Sep. 24, 1986, abandoned. This application May 18, 1989, Ser. No. 353,912

Int. Cl.[5] A01N *33/12*

U.S. Cl. 514—642 **3 Claims**

1. A biocidally active composition comprising a biocidally effective amount of a water soluble composition of a quaternary ammonium polyhalide of the formula:



wherein each substituent R_1R_2, R_3, and R_4 is independently selected from the group consisting of hydrogen, alkyl, alkyl ether, cyclic alkyl and hydroxyethyl; wherein said alkyl has between 1 and 10 carbon atoms, wherein at least two of the R_1, R_2, R_3 and R_4 substituents have between 8 and 10 carbon atoms; wherein no more than one of the substituents R_1, R_2, R_3, and R_4, is hydrogen; and wherein each X is independently selected from the group consisting of chlorine, bromine and iodine wherein the polyhalide is provided in admixture with an effective amount of a surfactant selected from the group consisting of poly(oxyethylene)/poly(oxypropylene) block copolymers, ethoxylated alkylphenols, phosphate esters, glycol esters, quaternary ammonium surfactants, aliphatic phosphate ester/ethylene oxide adducts and mixtures thereof, to formulate said water soluble composition.

4,978,686

METHOD OF PROTECTING CROPS BY A NON-TOXIC COMPOSITION

Kiyoshi Sotome, 4-10, Setagaya 2-chome, Setagaya-ku, Tokyo, Japan

Continuation of Ser. No. 179,333, Apr. 18, 1988, abandoned. This application Jan. 24, 1990, Ser. No. 469,723

Claims priority, application Japan, Apr. 13, 1987, 62-88950

Int. Cl.[5] A01N *35/00*

U.S. Cl. 514—698 **11 Claims**

1. A method of protecting crops against attack by insects, pathogenic fungi, or bacteria which comprises applying or spraying an insecticidally effective amount, a fungicidally effective amount, or a bactericidal effective amount of a composition comprising cinnamic aldehyde and an antioxidant on crops.

4,978,687

ANTI-VIRAL AGENT

Josep M. V. I. Pascuchi, Barcelona, Spain, assignor to Rhoderton Corporation N.V., Curacao, Netherlands

Continuation of Ser. No. 140,352, Jan. 4, 1988, abandoned. This application Aug. 14, 1989, Ser. No. 394,240

Claims priority, application United Kingdom, Dec. 8, 1987, 8728625

Int. Cl.[5] A61K *31/10*

U.S. Cl. 514—708 10 Claims

1. A method of treating an infection attributable to a retrovirus in a human or animal patient suffering from such infection, which method comprises the step of administering to said patient an effective amount to control said infection, of a compound of formula (I):

$$(R)_2S(O)_n \qquad (I)$$

wherein R is methyl or ethyl and n is 1 or 2.

4,978,688

METHOD OF TREATING WHITE BLOOD CELLS

Allan L. Louderback, 9661 Longden Ave., Temple City, Calif. 91780

Filed Mar. 24, 1989, Ser. No. 328,322

Int. Cl.[5] A01N *31/14*; A61K *31/075*

U.S. Cl. 514—722 7 Claims

1. A method for removing intracellular virus from white blood cells which comprises treating said white blood cells in vitro at a temperature of from about 2° C. to about 45° C. with an effective amount of about 0.2% to about 50% by volume of a special detergent which selectively lyses said white blood cells without causing substantial lyses of any red blood cells in admixture therewith to thereby release the white blood cell-contained virus into the cell medium or cell lysate, in which said special detergent is a polyethylene glycol fatty alcohol ether which contains from about 20 to 23 oxyethylene groups in the molecule and is a derivative of a C_{12}–C_{18} fatty alcohol.

4,978,689

CONVERSION OF SYNTHESIS GAS TO LIQUID HYDROCARBONS

Weldon K. Bell, Pennington, and Werner O. Haag, Lawrenceville, both of N.J., assignors to Mobil Oil Corp., Fairfax, Va.

Filed Mar. 17, 1989, Ser. No. 324,795

Int. Cl.[5] C07C *1/04*

U.S. Cl. 518—709 6 Claims

1. In a conventional medium pressure Fischer Tropach process for synthesis of a hydrocarbon mixture, which process comprises contacting under synthesis conditions a feed consisting of a substantially dry mixture of carbon monoxide and hydrogen carbon with an activated, alkali-promoted precipitated iron catalyst and recovering liquid hydrocarbons, the improvement comprising:

suspending said conventional synthesis;

treating said catalyst for about 0.5 to about 100 hours in a stream consisting essentially of water vapor under a combination of conditions including a temperature of 160 to 400° C., a total pressure of 10 to 1000 psig, and a partial pressure of water vapor effective to selectivate said catalyst; and,

resuming said conventional synthesis with said substantially dry mixture of carbon monoxide and hydrogen, whereby increasing the efficiency of said process for synthesizing liquid hydrocarbons.

4,978,690

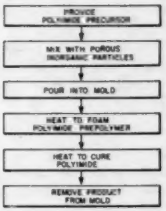
METHOD OF MAKING POROUS INORGANIC PARTICLE FILLED POLYIMIDE FOAM INSULATION PRODUCTS

Francis U. Hill, San Diego, Calif., assignor to Sorrento Engineering, Inc., National City, Calif.

Division of Ser. No. 312,490, Feb. 21, 1989, Pat. No. 4,865,784. This application Jul. 12, 1989, Ser. No. 367,625

Int. Cl.[5] C08J *9/40*, *9/32*

U.S. Cl. 521—54 4 Claims


PROVIDE POLYIMIDE PRECURSOR
MIX WITH POROUS INORGANIC PARTICLES
POUR INTO MOLD
HEAT TO FOAM POLYIMIDE PREPOLYMER
HEAT TO CURE POLYIMIDE
REMOVE PRODUCT FROM MOLD

1. A thermal insulation product comprising:

a cured substantially closed cell polyimide foam matrix;

substantially uniformly dispersed in said matrix from about 38 to 65 wt%, based on foam weight, of porous, lightweight, high temperature resistant inorganic particles;

said inorganic particles having flake-like configurations with average greatest dimension in the range of from about ¼ to ¾ inch and least dimension in the range of from about 1/32 to 1/16 inch.

4,978,691

POLYCARBONATEDIOL COMPOSITION AND POLYURETHANE RESIN

Takaaki Murai, and Tatsumi Fujii, both of Hiroshima, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Filed May 25, 1989, Ser. No. 356,909

Claims priority, application Japan, May 26, 1988, 63-127083; Dec. 9, 1988, 63-311452

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—172 8 Claims

1. A polycarbonatediol composition obtained by reaction in the absence of a solvent and in the presence of a catalyst of a compound selected from the group consisting of alkylene carbonates, diaryl carbonates and dialkyl carbonates, with an aliphatic diol which comprises a mixture of (1) from 20 to 80 mol % of a polyvalent alcohol in which the number of carbon atoms in the main polymer chain is from 3 to 20 and having at least one side chain, and (2) from 80 to 20 mol % of 1,6-hexanediol

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4,978,692

POLYIMIDE FOAM

Hiroshi Ezawa; Toshiyuki Nakakura; Takayuki Watanabe, and Hiroaki Tsushima, all of Kanagawa, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Division of Ser. No. 454,061, Dec. 19, 1989, Pat. No. 4,943,594. This application May 8, 1990, Ser. No. 520,444

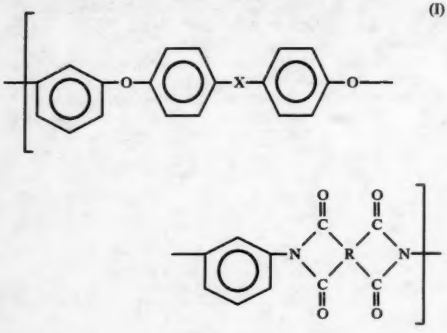
Claims priority, application Japan, Dec. 28, 1988, 63-334660

Int. Cl.[5] C08J *9/00*

U.S. Cl. 521—185 5 Claims

1. A thermoplastic polyimide foam having an average cell diameter of the foam of from 0.1 to 1.0 μm and a closed cell content of the foam of 50% or more of the cells and an apparent density of from 0.02 to 0.2 g/cc and essentially consisting of recurring units of the formula (I):

(I)



wherein X is a radical selected from the group consisting of a direct bond, divalent hydrocarbon having from 1 to 10 carbon atoms, hexafluorinated isopropylidene, carbonyl, thio, or a sulfonyl, and R is a tetravalent radical selected from the group consisting of an aliphatic radical having two or more carbon atoms, cycloaliphatic radical, monoaromatic radical, condensed polyaromatic radical, and condensed polyaromatic radical wherein aromatic radicals are mutually connected with a direct bond or a crosslinking function.

4,978,693

POLYPHENYLENE OXIDE MOLDINGS RADIATION CROSSLINKED WITH (METH)ACRYLATED PHOSPHORIC ACID OR ADMIXTURES

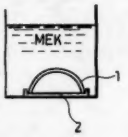
Yoshito Sakamoto, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 28, 1988, Ser. No. 225,422

Claims priority, application Japan, Jul. 28, 1987, 62-189473; Sep. 16, 1987, 62-233269

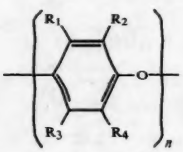
Int. Cl.[5] C08F *283/08, 291/18;* **C08K** *5/10, 5/3492*

U.S. Cl. 522—137 **5 Claims**



1. A molding of modified polyphenylene oxide resin comprising a composite of modified polyphenylene oxide resin containing polyphenylene oxide having the formula (I) as a basic skeleton,

(I)



wherein

R_1, R_2, R_3, and R_4 represent univalent substituents selected from the group consisting of hydrogen, alkyl, halogen, alcoxyl and haloalkoxyl and

n represents a natural number,

the molding being cross-linked by ionizing radiation of 0.5-80 Mrad and the composite of modified polyphenylene oxide resin containing a phosphoric ester having an acrylate or methacrylate group as a cross-linking agent.

4,978,694

SILICONE WATER BLOCK FOR ELECTRICAL CABLES

Gary A. Vincent, and Daniel F. Meyer, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 41,558, Apr. 23, 1987, Pat. No. 4,845,309. This application Apr. 28, 1989, Ser. No. 344,798

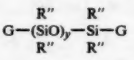
Int. Cl.[5] H02G *15/00*

U.S. Cl. 523—173 **7 Claims**

1. A curable cable water block composition consisting essentially of:

(A) an Si-H endblocked polydiorganosiloxane fluid having a viscosity of 0.5 to about 100 centistokes at 25° C. and represented by the formula $H(R'_2SiO)_x(R'_2Si)H$ wherein R' is independently selected from alkyl radicals having from 1 to 6 carbon atoms or the phenyl radical and the average value of x is 1 to 40;

(B) a polydiorganosiloxane fluid having a viscosity of 0 5 to about 100 centistokes at 25° C. and represented by the formula



wherein G denotes unsaturated radicals independently selected from a vinyl group or higher alkenyl radicals represented by the formula $—R'''(CH_2)mCH{=}CH_2$, in which R''' denotes $—(CH_2)_p—$ or $—(CH_2)qCH{=}CH—$, m is 1, 2. or 3. p is 3 or 6 and q is 3. 4 or 5, R'' is independently selected from an alkyl radical having 1 to 6 carbon atoms or a phenyl radical and y is on the average from 1 to about 40;

(C) a siloxane crosslinker selected from short chain linear or cyclic siloxanes containing SiH functionality or Si-G functionality, in which G has the above-defined meaning;

(D) sufficient hydrosilation catalyst to cure the mixture of (A), (B), and (C); and

(E) sufficient polymerization inhibitor to prevent the water block composition from curing to a non-flowing state before the cable is filled with the combination of (A), (B), (C), (D) and (E).

4,978,695

FINE-PARTICLE AGGREGATE EMULSION AND PROCESS FOR PRODUCING SAME

Futoshi Hoshino, Tokyo; Makoto Nakano, and Takeshi Yanagihara, both of Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,304

Claims priority, application Japan, May 16, 1988, 63-117098; Aug. 10, 1988, 63-198051

Int. Cl.[5] C08L *33/10*

U.S. Cl. 523—201 **21 Claims**

1. An oil-in-water emulsion of fine-particle aggregate particles having a diameter of 0.2 to 3.0 μ and formed from 0.5 to 90 parts by weight of a polymer (a) of 1 to 50 parts by weight of an unsaturated carboxylic acid and 99 to 50 parts by weight of at least one vinyl monomer copolymerizable therewith, and 99.5 to 10 parts by weight of another polymer (b) of at least one vinyl monomer differing in composition from that of copolymer (a), said polymer (b) having a glass transition temperature of 50° C. or above and being present inhomogeneously with copolymer (a) in each aggregate particle in the form of a plurality of fine particles having a diameter of 0.05 to 0.5 μ.

4,978,696

OPTICALLY CLEAR ORGANOSILOXANE ADHESIVE COMPOSITIONS

Joseph N. Clark, Mapleton; David G. Coble, and Loretta N. Kroupa, both of Midland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jun. 22, 1989, Ser. No. 369,882
Int. Cl.[5] C08K 9/06
U.S. Cl. 523—212 7 Claims

1. In an optically clear liquid organosiloxane composition exhibiting cohesive bonding to a surface of substrates selected from the group consisting of glass and synthetic organic polymers, said composition comprising

A. a liquid dimethylvinylsiloxy-terminated polydimethylsiloxane,

B. an optically clear reinforcing filler,

C. an amount of a liquid organohydrogensiloxane sufficient to cure said composition to a solid material, where the organic portion of said organohydrogensiloxane is selected from hydrocarbon radicals and halogen substituted hydrocarbon radicals where the halogen is fluorine and chlorine,

D. an amount of a hydrosilylation reaction catalyst sufficient to promote curing of said composition, and

E. an amount of a first liquid polydimethylsiloxane sufficient to achieve cohesive bonding between said composition and said substrates, where said first polydimethylsiloxane contains a silanol group at each of the two terminal positions, the improvement comprising the presence in said composition of

F. from 0.1 to 2 weight percent, based on the weight of said composition, of a liquid silanol-terminated polymethylvinylsiloxane containing an average of from 2 to 20 repeating units per molecule, and

G. from 0 to 25 percent, based on the weight of said composition, of a second liquid polydimethylsiloxane containing a silanol group at one of the two terminal positions and a trimethylsiloxy group at the second terminal position.

4,978,697

PROCESS FOR THE PRODUCTION OF THERMOSETTING RESINS

Philippe Clavier, 27 Avenue de St-Germain, 78160 Marly Le Roi, France

Filed Dec. 23, 1988, Ser. No. 288,819
Claims priority, application France, Dec. 23, 1987, 87 18035; Apr. 15, 1988, 88 05035
Int. Cl.[5] C08L 3/00, 3/02, 61/14; C08G 8/10
U.S. Cl. 524—27 6 Claims

1. A process for the manufacture of a thermosetting resin, comprising hydrolyzing whey at a pH of about 7 and in the presence of lactase to obtain a mixture of glucose and galactose and then reacting said mixture with an organic compound having at least one hydrogen function at a temperature which does not exceed about 100° C., to obtain a thermosetting resin.

4,978,698

BITUMEN-POLYOLEFIN COMPOSITIONS

Raymond T. Woodhams, Toronto, Canada, assignor to The University of Toronto Innovations Foundation, Toronto, Canada

Continuation-in-part of Ser. No. 21,844, Mar. 4, 1987, abandoned. This application Nov. 10, 1988, Ser. No. 269,604
Claims priority, application Canada, Mar. 4, 1986, 503241
Int. Cl.[5] C08L 95/00, 91/06
U.S. Cl. 524—62 15 Claims

1. A bitumen-polyolefin composition suitable for mixing with aggregates to provide paving compositions, the bitumen-polyolefin composition comprising a continuous bitumen phase and a dispersed polyolefin phase, said polyolefin phase b[illegible]; present therein as discrete regions stabilized with an emulsifier system comprising a polyethylene wax terminally functionalized with acidic groups, said polyolefin wax having a molecular weight of from about 1,000 to about 10,000 and having main polymeric chains compatible with said dispersed polyolefin phase;

wherein said polyolefin is present in an amount of from about 2% to about 20% by weight of the composition and said polyethylene wax is present in an amount of from about 0.1% to about 5% by weight of the composition.

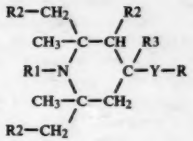
4,978,699

LIGHT STABILIZING FLAME RETARDANTS

Robert T. Kazmierczak, and Ronald E. MacLeay, both of Williamsville, N.Y., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Oct. 24, 1988, Ser. No. 261,442
Int. Cl.[5] C08K 5/3417, 5/3435; C07D 401/00
U.S. Cl. 529—99 18 Claims

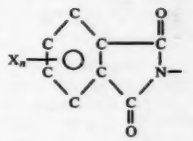
1. A flame retardant light stabilizer comprising a hindered amine light stabilizer having Formula I:



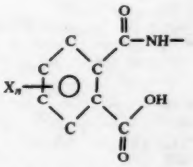
I

wherein

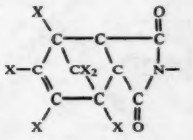
R is a halogen-substituted flame retardent radical of Formula II, III, IV or V:



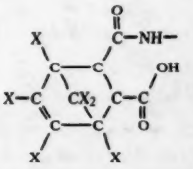
II



III



IV



V

X is chlorine or bromine or a combination thereof;

n is an integer from 1 to 4;

R1 is hydrogen, an alkyl radical of 1 to 20 carbons, an alkenyl radical of 3 to 6 carbons, an aralkyl radical of 7 to 12 carbons, an aliphatic acyl radical of 1 to 10 carbons, an

aromatic acyl radical of 7 to 13 carbons, an alkoxy carbonyl radical of 2 to 9 carbons, an aryloxy carbonyl radical of 7 to 13 carbons, a hydroxyalkyl radical of 1 to 5 carbons or an epoxyalkyl radical of 3 to 6 carbons;

R2 is hydrogen or an alkyl radical of 1 to 4 carbons;

R3 is hydrogen, hydroxyl or an alkoxy radical of 1 to 4 carbons;

when R3 is hydrogen, Y is a direct bond, or a divalent radical —Z—R4—C(O)—N(R5)—, —Z—C(O)—N(R-5)—, —Z—C(O)—R6—C(O)—N(R5)—, —R4—C-(O)—N(R5)— or —C(O)—N(R5)—, where Z is —O—, —N(R7)— or —N(R7)—R8—N(R7)—;

when R3 is hydroxyl or an alkoxy radical, Y is a divalent radical —R4—C(O)—N(R5)— or —C(O)—N(R5)—;

R4 is an alkylene diradical of 1 to 4 carbons;

R5 is hydrogen, a primary alkyl radical of 1 to 8 carbons, a secondary alkyl radical of 3 to 8 carbons, an aralkyl radical of 7 to 12 carbons or a cycloalkyl radical of 5 to 12 carbons;

R6 is a direct bond, a substituted or unsubstituted alkylene diradical of 1 to 14 carbons, a substituted or unsubstituted oxydialkylene diradical of 4 to 20 carbons, a substituted or unsubstituted thiodialkylene diradical of 4 to 10 carbons, a substituted or unsubstituted alkenylene diradical of 2 to 10 carbons, or a substituted or unsubstituted o-, m- or p-phenylene diradical, the R6 substituents comprising a lower alkyl radical of 1 to 4 carbons, a lower alkoxy radical of 1 to 4 carbons, hydroxy, bromine, chlorine a mercapto radical or a lower alkylmercapto radical of 1 to 4 carbons;

R7 is hydrogen, an alkyl radical of 1 to 10 carbons, an aryl radical of 6 to 12 carbons, an aralkyl radical of 7 to 12 carbons or a cycloalkyl radical of 5 to 12 carbons; and

R8 is an alkylene diradical of 2 to 12 carbons.

4,978,700

EXTRUDABLE ANTI-STATIC POLYVINYL CHLORIDE RESIN COMPOSITIONS, AND SHAPED ARTICLES FORMED THEREOF

David L. Haygood, Florence, Ala., assignor to Edward S. Robbins, III, Florence, Ala.

Continuation-in-part of Ser. No. 60,275, Jun. 10, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,878

Int. Cl.[5] C08K *5/41, 5/19, 3/08*

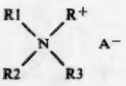
U.S. Cl. 524—156 **14 Claims**

1. An extrudable, anti-static polyvinyl chloride resin composition, consisting essentially of:

(i) between about 90 to about 110 parts by weight of a polyvinyl chloride resin;

(ii) between about 8 to about 16 parts by weight of a barium-cadmium-zinc stabilizer; and

(iii) between about 6 to about 13 parts by weight of an ionic anti-static agent comprised of a quaternary ammonium compound of the formula:



where R, R1, and R2 are hydroxyalkylene radicals, R3 is an alkyl radical, and A is an anion, and wherein

(iv) said barium-cadmium-zinc stabilizer is present in the form of a blend of between about 1.0 to about 5.0 wt. % barium, between about 0.5 to about 2.5 wt. % cadmium, and between about 0.01 to about 1.0 wt. % zinc in an organic solvent for the same, and has a specific gravity of less than about 1.033 with the specific gravity of water being equal to 1.0, an evaporation rate of less than 1 with the evaporation rate of butyl acetate being equal to 1, and a viscosity SUS at 100° F. of less than 100.

4,978,701

DIORGANOPOLYSILOXANES CONTAINING ITACONATE FUNCTIONAL GROUPS

Francois Chizat, Bron, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed May 10, 1989, Ser. No. 349,822

Claims priority, application France, May 10, 1988, 88 06558

Int. Cl.[5] C08K *5/24*

U.S. Cl. 524—265 **12 Claims**

1. A diorganopolysiloxane comprising at least one recurring structural unit of the formula (1):

$$ZR_aSiO_{\frac{3-a}{2}} \quad (1)$$

in which a is 1 or 2; the symbol Z is one of the radicals $—CH_2CH(COOR')CH_2COOR'$ or $—C(CH_3)(COOR')CH_2COOR'$; the symbols R, which may be identical or different, are each a C_1–C_{20} alkyl, vinyl, phenyl or 3,3,3-trifluoropropyl radical, and, where a=2, one of the radicals R may be a hydroxyl group; and the symbols R', which may be identical or different, are each a C_1–C_{12} monovalent hydrocarbon radical or a C_2–C_{12} monovalent alkoxyalkyl radical.

4,978,702

COATING COMPOSITION

Masahiro Yuyama; Masahiko Moritani, and Mikio Futagami, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 98,471, Sep. 18, 1987, abandoned. This application Aug. 26, 1988, Ser. No. 237,690

Claims priority, application Japan, Sep. 18, 1986, 61-220319

Int. Cl.[5] C08K *5/50*

U.S. Cl. 524—266 **6 Claims**

1. A coating composition which comprises:

(A) 15 to 65% by weight calculated as SiO_2 of colloidal silica;

a partially hydrolyzed and partially co-condensed product of the following component (B) and component (C):

(B) 10 to 80% by weight calculated as $R^1Si(OH)_3$ of a trialkoxysilane of the formula: $R^1Si(OR^2)_3$ wherein R^1 is methyl or vinyl and R^2 is alkyl having 1 to 4 carbon atoms;

(C) 3 to 35% by weight calculated as $R^3{}_nSi(OH)_{4-n}$ of an acetoxysilane of the formula: $R^3{}_nSi(OCOCH_3)_{4-n}$ wherein R^3 is vinyl, and n is 1 , provided that the amount of component (B) wherein R^1 is methyl is in the range of from 10% by weight to less than 70% by weight based on the whole amount of components (B) and (C): and

(D) a solvent.

4,978,703

THERMOPLASTIC ELASTOMERS BASED UPON CHLORINATED POLYETHYLENE AND A CRYSTALLINE OLEFIN POLYMER

Oliver C. Ainsworth, and Ronald L. Glomski, both of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 4, 1990, Ser. No. 462,666

Int. Cl.[5] C08L *23/26, 23/28;* **C08K** *5/10*

U.S. Cl. 524—298 **34 Claims**

1. A process for preparing a partially crosslinked blend thermoplastic elastomer material having a tension set value, at 100% elangation, of less than about 50% from a blend of an amorphous chlorinated polyethylene, a crystalline thermoplastic polyolefin polymer, and a thermoplastic chlorinated polyethylene, the process comprising:

a. forming a heat-plastified, substantially uniform admixture comprising an amorphous chlorinated polyethylene, a crystalline thermoplastic polyolefin polymer and an inorganic base;

b. dispersing a vulcanizing material for the chlorinated polyethylene throughout the admixture while mixing said

admixture at a temperature sufficient to activate the vulcanizing material without substantially degrading any component of the composition and for a period of time sufficient to cure substantially all of the chlorinated polyethylene, the vulcanizing material comprising (1) a derivative of 2,5-dimercapto-1, 3,4-thiadiazole or (2) a combination of 2,5-dimercapto-1, 3,4-thiadiazole and an activator material; and

c. dispersing in the vulcanized admixture prepared in step (b), a material comprising a chlorinated polyethylene free from additional vulcanizing material for a period of time sufficient to achieve substantially uniform admixture and at a temperature sufficient to produce a molten partially crosslinked blend of a thermoset chlorinated polyethylene in a thermoplastic chlorinated polyethylene.

4,978,704

STORAGE-STABLE ORGANOPOLYSILOXANE COMPOSITIONS MOISTURE-CURABLE INTO ELASTOMERIC STATE

Patrice Perrin, Lyons, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Filed Apr. 7, 1989, Ser. No. 334,692

Claims priority, application France, Apr. 7, 1988, 88 04850

Int. Cl.[5] C08K *3/38*

U.S. Cl. 524—404 **14 Claims**

1. An organopolysiloxane composition of matter that is storage-stable under anhydrous conditions, but curable into elastomeric state in the presence of moisture, which comprises (A) at least one α,ω-dihydroxydiorganopolysiloxane polymer having a viscosity of 700 to 1,000,000 mPa at 25° C., comprising recurring diorganosiloxy structural units of the formula T_2SiO, in which the T radicals, which may be identical or different, are hydrocarbon radicals having from 1 to 10 carbon atoms, at least 50% of the number of such T radicals being methyl radicals; (B) at least one acyloxysilane crosslinking agent therefor; and (C) 0.1 to 10 parts by weight of a bonding agent comprising admixture, or interruption product of:

(i) an aminoorganosilicon compound C_1 bearing at least one amino functional group and comprising a primary amine substituent; and

(ii) an organosilicon compound C_2 bearing at least one epoxy functional group and having from 4 to 20 carbon atoms in a ratio of 0.01 to 2 gram-equivalents of primary amine group in C_1 per one gram equivalent of epoxy functional group in C_2.

4,978,705

SILICONE RUBBER CONTAINING ALKALI METAL SALTS OF PHOSPHORIC ACID AND PHOSPHOROUS ACID AND COMPOSITIONS THEREFOR

Peter Lamont, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation-in-part of Ser. No. 137,985, Dec. 24, 1987, abandoned. This application Sep. 29, 1988, Ser. No. 251,148

Int. Cl.[5] C08K *3/32*

U.S. Cl. 524—417 **11 Claims**

1. In a silicone rubber comprising the product obtained by curing a composition which is based on a polydiorganosiloxane, the improvement consisting of having present in the composition from 0.0002 to 0.052 weight percent of an anhydrous salt selected from the group consisting of di-(alkali metal) hydrogen phosphate, an alkali metal dihydrogen phosphate, a di-(alkali metal) hydrogen phosphite, an alkali metal dihydrogen phosphite, and mixtures thereof.

4,978,706

SILICONE SEALANTS

John E. Dietlein, Elizabethtown, Ky.; Russell P. Kamis, Midland, and Jerome M. Klosowski, Bay City, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Aug. 28, 1989, Ser. No. 399,103

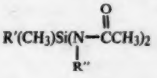
Int. Cl.[5] C08K *3/30*

U.S. Cl. 524—423 **14 Claims**

1. A silicone composition which is stable in the absence of moisture and which cures upon exposure to moisture to give an elastomer consisting essentially of the product obtained

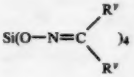
(A) 100 parts by weight of hydroxyl containing polydiorganosiloxane having a viscosity of from 10 to 100 Pa.s at 25° C., the organo groups being selected from the group consisting oi monovalent substituted or unsubstituted hydrocarbons having from 1 to 6 carbon atoms,

(B) from 0.1 to 7 parts by weight of diacetamido functional silane of the formula



in which R′ is an organic radical selected from the group consisting of methyl and vinyl and R″ is an organic radical selected from the group consisting of methyl, ethyl, propyl, butyl, and phenyl, and

(C) from 0.1 to 7 parts by weight of tetraoximino functional silane of the formula



where R^y is a radical selected from the group consisting of methyl, ethyl, propyl, butyl, phenyl, and hydrogen, the ratio of (B) to (C) being from 0.1 to 3.

4,978,707

AQUEOUS DISPERSION AND PROCESS FOR PREPARATION THEREOF

Mutsuhiro Tanaka, and Shiro Honma, both of Otake, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Feb. 17, 1987, Ser. No. 15,223

Claims priority, application Japan, Apr. 24, 1986, 61-93374

Int. Cl.[5] C08L *51/00*

U.S. Cl. 524—504 **20 Claims**

1. An aqueous dispersion comprising (i) a hydrophobic thermoplastic polymer selected from the group consisting of polyolefins, ethylene/vinyl compound copolymers, styrene resins, polyvinyl chloride, polyvinylidene chloride, vinyl chloride-vinylidene chloride copolymer, polymethylacrylate, polymethylmethacrylate, polyamides, thermoplastic polyesters, polycarbonates and polyphenyleneoxide, (ii) a water-insoluble and non-water swelling thermoplastic polymer containing at least one of a neutralizable or saponifiable carboxylic acid or its anhydride or ester group bonded to the polymer chain at a concentration of 0.1 to 5 millimole equivalents as —COO— per gram of the polymer and having a good compatibility with the thermoplastic resin (i), or at least one of a neutralized or saponified product of said water-insoluble and non-water swelling thermoplastic polymer, (iii) water, said aqueous dispersion being apparently solid and having a water content of not less than 0.5 but less than 3% by weight and an electric resistance lower than 10^6 Ω-cm and also having such a property that when water is added to the dispersion, solids are uniformly dispersed as fine particles in the aqueous phase.

4,978,708

AQUEOUS-BASED COATING COMPOSITIONS COMPRISING ANIONIC POLYURETHANE PRINCIPAL RESIN AND ANIONIC ACRYLIC GRIND RESIN

Chris W. Fowler, Walled Lake; Michael C. Knight, Centerline, and Anthony J. Nicholas, Clawson, all of Mich., assignors to BASF Corporation, Clifton, N.J.

Filed Apr. 25, 1989, Ser. No. 343,119
Int. Cl.[5] C08L 75/04
U.S. Cl. 524—507 22 Claims

1. An aqueous-based basecoat composition suitable for deposition onto a metal or plastic substrate comprising:

(A) anionic polyurethane principal resin, present in an amount of from about 5% to 60% by weight of the final solids content of said basecoat composition, said anionic polyurethane resin comprising the reaction product of:

(1) a polyester component comprised of the reaction product of

(a) a carboxylic acid component wherein said carboxylic acid component is comprised of at least about 50% by weight of at least one long-chain carboxylic acid of from between 18 and 60 carbon atoms, and at least one short-chain dicarboxylic acid; and

(b) an alcohol having at least two hydroxyl groups;

(2) a multi-functional compound having at least one active hydrogen and at least one carboxylic acid functionality;

(3) a compound having at least two active hydrogen groups selected from the group consisting of hydroxyl, sulfhydryl, primary amines accounting for one active hydrogen; and

(4) a polyisocyanate;

(B) an aminoplast cross-linking resin, present in an amount of from about 5% to 50% by weight of the final solids content of said basecoat composition;

(C) a branched chain polyester resin, present in an amount of from about 5% to 35% by weight of the final solids content of said basecoat composition, said branched chain polyester resin comprising the reaction product of:

(1) a polyester component comprising the reaction product of:

(a) a carboxylic acid component comprised of at least 50% by weight of at least one long-chain carboxylic acid of from 18 to 60 carbon atoms, and not more than 50% by weight of at least one short-chain dicarboxylic acid; and

(b) an alcohol component having an average functionality of at least 2; and

(2) a polyfunctional carboxylic acid or acid anhydride, present in an amount of from about 2% to 25% by weight of the final solids content of said basecoat composition, said polyfunctional carboxylic acid or acid anhydride having at least three carboxylic acid groups or incipient carboxylic acid groups present as anhydride functionalities; and

(D) an anionic acrylic pigment grind resin, present in an amount of from about 2% to 75% by weight of the final solids content of said basecoat composition, said grind resin comprising the reaction product of:

(1) from about 60% to about 90% by weight of one or more monomers selected from the group consisting of C_1–C_{20} alkyl acrylates, C_1–C_{20} alkyl methacrylates, styrene, and vinyltoluene;

(2) from about 5% to about 35% by weight of one or more reactive monomers selected from the group consisting of hydroxyethyl acrylate, hydroxyethyl methacrylate, hydroxypropyl acrylate, hydroxypropyl methacrylate, the glycidyl ester of acrylic acid, and the glycidyl ester of methacrylic acid;

(3) from about 5% to about 20% by weight of one or more α,β-ethylenically unsaturated carboxylic acids or acid anhydrides selected from the group consisting of acrylic acid, methacrylic acid, maleic anhydride, and fumaric acid;

said aqueous-based basecoat coating composition having a humidity window of application between about 50% and 90% relative humidity, and improved shelf-life and color stability.

4,978,709

POLYAMIDES AND THERMOSENSITIVE IMAGE TRANSFER RECORDING MEDIUM USING THE SAME

Keishi Taniguchi, Susono, and Junko Yamaguchi, Shizuoka, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 279,201
Claims priority, application Japan, Dec. 3, 1987, 62-306285; Dec. 28, 1987, 62-332988; Mar. 17, 1988, 63-65245
Int. Cl.[5] C08L 77/06, 77/10; C09D 11/10
U.S. Cl. 524—606 5 Claims

1. A thermofusible ink layer for a thermosensitive image transfer recording medium, which ink layer comprises a binder agent and coloring agent which is dispersed in the binder agent, said binder agent consisting essentially of a low-molecular weight mixed polyamide selected from the group consisting of (i), (ii), and (iii) wherein (i) is of the formula (A):

$$CO—X—COHN—Y—NH, \quad (A)$$

wherein X is a combination of the radicals $—CH_2—_7$ and $—CH_2—_8$ in a ratio of 20 to 100: 80 to 0 in the polyamide and Y is a combination of the radicals $—C_3H_6O—C_2H_4O—C_2H_4OC_3H_6)—$ and $—C_3H_6OC_2H_4O\ C_3H_6—$ at a ratio ranging from 20 to 80: 80 to 20 in the polyamide;

wherein (ii) is of formula (B):

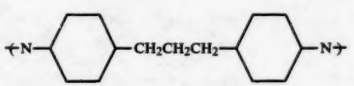
$$—CO—X—COHN—Y'—NH— \quad (B)$$

wherein X is as defined above, and Y' is a combination of the radicals $C_3H_6OC_2H_4OC_2H_4OC_3H_6$, $C_3H_6OC_2H_4OC_3H_6$ and $C_3H_6OC_4H_8OC_3H_6$ at a ratio ranging from 5 to 90: 5 to 90: 5 to 90 in the polyamide;

and wherein (iii) is of formula (C):

$$CO—X—CO—Y'')— \quad (C)$$

wherein X is as defined above, and Y'' is a combination of the radicals $—HNC_3H_6OC_2h_4OC_2H_4OC_3H_6NH—$, $—HNC_3H_6OC_2H_4OC_{32}H_4OC_3H_6NH—$ and



in a ratio ranging from 10 to 10 to 80: 10 to 80 in the polyamide.

4,978,710

METHOD OF PRODUCING SILICONE EMULSION

Donald T. Liles, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 9, 1987, Ser. No. 130,764
Int. Cl.[5] C08L 83/05
U.S. Cl. 524—837 8 Claims

1. A method of producing an aqueous silicone emulsion which dries to an elastomer comprising

(A) homogenizing a mixture of

(1) 100 parts by weight of hydroxyl endblocked polydiorganosiloxane free of aliphatic unsaturation,

(2) from 0.1 to 10 parts by weight of silicon hydride cross-linker,

(3) sufficient platinum compound catalyst, compatible with the polydiorganosiloxane, to give from 1 to 200 parts by weight of platinum per million parts of polydiorganosiloxane (1),

(4) catalyst inhibitor,

(5) anionic or nonionic surfactant, and

(6) sufficient water to yield a polydiorganosiloxane content in the mixture of from 40 to 70 percent by weight, the catalyst inhibitor (4) being added to the mixture before the catalyst (3),

(B) emulsion polymerizing the mixture of (A) by addition of anionic polymerization catalyst to give a polymer, then,

(C) arresting polymerization by raising the pH to 6 to 7.5, whereby an aqueous silicone emulsion is obtained which gives an elastomer upon removal of the water at room temperature.

4,978,711

AQUEOUS AMINORESIN SOLUTIONS FOR LOW-FORMALDEHYDE SURFACE BONDING

Christof Schmidt-Hellerau, Ludwigshafen; Engelbert Weber, Neustadt, and Guenther Matthias, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 24, 1989, Ser. No. 314,956

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1988, 3807402

Int. Cl.[5] C08L *75/00, 61/00;* **C08F** *283/00;* **C08G** *8/28*

U.S. Cl. 524—841 **7 Claims**

1. An aqueous aminoresin solution for low-formaldehyde surface bonding based on condensates of melamine, urea, phenol and formaldehyde having a molar ratio of from 1.4 to 1.8 moles of formaldehyde, from 0.04 to 0.1 mole of melamine and from 0.015 to 0.04 mole of phenol per mole of urea, relative to the total amount of the amino resin, obtainable by mixing

(A) from 20 to 40% by weight of a melamine/urea/phenol/-formaldehyde condensate with

(B) from 60 to 80% by weight of a urea/formaldehyde condensate.

4,978,712

METHOD FOR FABRICATING DEVICES INCLUDING POLYMERIC MATERIALS

Harvey E. Bair, Chester, and Shiro Matsuoka, Basking Ridge, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 16, 1989, Ser. No. 324,491

Int. Cl.[5] C08G *59/00, 73/10, 85/00*

U.S. Cl. 525—51 **7 Claims**

1. A method for fabricating a device which includes at least one device component, comprising the steps of:

at least partially curing a material region including polymeric or oligomeric material capable of undergoing crosslinking and/or imidization, which material region contacts at least a portion of said device component;

incorporating at least a portion of the at least partially cured material into said device; and

completing the fabrication of said device, characterized in that

said curing step includes the step of heating said material region at, at least, first and second heating temperatures, said second heating temperature being greater than said first heating temperature, said material exhibiting glass transition temperatures corresponding to the states of cure of said material during said heating, the rate at which heat is supplied to said material during said heating being chosen in relation to said material so that the temperatures of said material during said heating are less than, or equal to, the corresponding glass transition temperatures of said material, and if said material is capable of undergoing crosslinking, then heat is supplied at a rate such that a rate of increase of temperature of said material is greater than about 12 degrees C. per hour during at least a portion of said heating.

4,978,713

POLYVINYL ALCOHOL DERIVATIVES CONTAINING PENDANT VINYLIC MONOMER REACTION PRODUCT UNITS BOUND THROUGH ETHER GROUPS AND HYDROGEL CONTACT LENSES MADE THEREFROM

Merrill Goldenberg, Teaneck, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

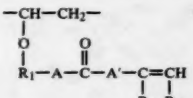
Filed Dec. 16, 1987, Ser. No. 133,575

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—61 **9 Claims**

1. A contact lens which is the crosslinked, substantially transparent copolymerication product of

(a) a derivative of poly(vinyl alcohol), having a weight average molecular weight of at least 2000, wherein between 0.1 and 90 percent of the total number of hydroxyl groups on said poly(vinyl alcohol) are reacted to give a repeating structural unit of formula I



(I)

wherein

R_1 is a straight or branched chain alkylene of 1 to 20 carbon atoms, or a straight or branched chain alkylene of 2 to about 100 carbon atoms interrupted by one or more carbonyloxy, sulfonamido, carbonamido, sulfonyl or oxy groups, R_1 being unsubstituted or further substituted by hydroxy,

A is —O—, —NH— or —NHCONR"— where R" is hydrogen or lower alky, and A' is a direct bond, or

A is a direct bond and A' is —O— or —O—CH_2—,

R_2 is hydrogen or methyl, and

R_3 is hydrogen, methyl or —$COOR_4$ where R_4 is hydrogen or lower alkyl with the proviso that when R_2 is methyl, R_3 is hydrogen; and

(b) a polymerizable vinyl monomer wherein for each repeating structural unit of formula I there are from 0.01 to 80 units of said polymerizable vinyl monomer with the proviso that at least 50% by weight of the polymerizable vinyl monomer is a hydrophobic vinyl monomer.

4,978,714

MODIFIED HALOBUTYL THERMOPLASTIC ELASTOMER

Ghawamedin Bayan, West Chester, and Anthony S. Esposito, Pottstown, both of Pa., assignors to The West Company Incorporated, Phoenixville, Pa.

Filed Mar. 1, 1989, Ser. No. 317,606

Int. Cl.[5] C08L *53/00*

U.S. Cl. 525—69 **14 Claims**

1. A thermoplastic elastomer composition having low tack and good structural integrity, comprising an admixture of:

(a) a halobutyl rubber cured by dynamic vulcanization in the presence of sufficient thermoplastic elastomeric material to function as a continuous phase for said vulcanization; and

(b) at least a coefficient of friction reducing amount of an uncured organopolysiloxane grafted EPDM polymer.

4,978,715

SOLVENT-RESISTANT, COMPATIBLE BLENDS OF POLYPHENYLENE ETHERS AND LINEAR POLYESTERS

Sterling B. Brown; Dennis J. McFay, both of Schenectady; John B. Yates, III, Glenmont, and Gim F. Lee, Albany, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

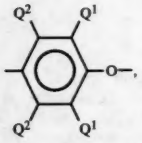
Continuation-in-part of Ser. No. 891,457, Jul. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 761,712, Aug. 2, 1985, abandoned, and a continuation-in-part of Ser. No. 828,410, Feb. 11, 1986, abandoned. This application Aug. 15, 1988, Ser. No. 232,413

Int. Cl.[5] C08L *53/02, 69/00, 71/12*

U.S. Cl. 525—92 22 Claims

1. A resinous composition which comprises the following resinous components and any reaction products thereof, all percentage proportions being by weight of total resinous components:

(A) about 10–45% of at least one polyphenylene ether containing no more than about 800 ppm. of unneutralized amino nitrogen, said polyphenylene ether comprising structural units having the formula



(I)

wherein in each of said units independently, each Q^1 is independently halogen, primary or secondary lower alkyl, phenyl, haloalkyl, aminoalkyl, hydrocarbonoxy, or halohydrocarbonoxy wherein at least two carbon atoms separate the halogen and oxygen atoms, and each Q^2 is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl, haloalkyl, hydrocarbonoxy or halohydrocarbonoxy as defined for Q^1, or grafted or coupled derivatives thereof;

(B) about 10–46% of at least one poly(alkylene dicarboxylate), the weight ratio of component A to component B being at most 1.2:1;

(C) from 8% to about 25% of at least one elastomeric polyphenylene ether-compatible impact modifier;

(D) from 3% to about 40% of at least one polymer containing a substantial proportion of aromatic polycarbonate units and having a weight average molecular weight of at least about 40,000 as determined by gel permeation chromatography relative to polystyrene; and

(E) at least one compound selected from those containing at least one cyanurate or isocyanurate moiety and those containing a plurality of epoxide moieties, in the amount of about 0.1–1.0 part per 100 parts of resinous components.

4,978,716

THERMOPLASTIC ELASTOMERS BASED UPON CHLORINATED POLYETHYLENE AND A CRYSTALLINE OLEFIN POLYMER

James H. Flynn; Oliver C. Ainsworth, both of Baton Rouge, and Robert R. Blanchard, Brusly, all of La., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 178,750, Apr. 7, 1988, Pat. No. 4,910,245. This application Dec. 11, 1989, Ser. No. 453,880

Int. Cl.[5] C08L *23/26, 23/28*

U.S. Cl. 525—195 20 Claims

1. A process for preparing a thermoplastic elastomer material having a tension set value, at 100% elangation, of less than about 50% from a blend of an amorphous chlorinated polyethylene and a crystalline thermoplastic polyolefin polymer, the process comprising:

a. forming a heat-plastified, substantially uniform admixture comprising an amorphous chlorinated polyethylene, a plasticizing material compatible with the chlorinated polyethylene, a crystalline thermoplastic polyolefin polymer and an inorganic base; and

b. dispersing a vulcanizing material for the chlorinated polyethylene throughout the admixture while mixing said admixture at a temperature sufficient to activate the vulcanizing material without substantially degrading any component of the composition and for a period of time sufficient to cure substantially all of the chlorinated polyethylene, the vulcanizing material comprising (1) a derivative of 2,5-dimercapto-1,3,4-thiadiazole or (2) a combination of 2,5-dimercapto-1,3,4-thiadiazole and an activator material.

4,978,717

THERMOELASTIC COMPOSITION OF ETHYLENE-1-OLEFIN COPOLYMER AND RUBBER

Donald R. Hazelton, Chatham, and Robert C. Puydak, Cranbury, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Apr. 19, 1989, Ser. No. 340,483

Int. Cl.[5] C08L *23/26, 23/20, 9/00, 23/16*

U.S. Cl. 525—195 22 Claims

1. A thermoplastic elastomeric composition comprising:

(a) a thermoplastic resin comprising at least about 25 weight percent, based on the weight of said thermoplastic resin, of a plastomeric copolymer selected from the group consisting of ethylene-hexene copolymer, ethylene-butene copolymer, and mixtures thereof, said plastomeric copolymer having a density of less than about 0.900 and a degree of crystallinity measured as a heat of fusion of from about 5 to about 85 J/g, said ethylene-hexene copolymer comprising at least about 20 weight percent of said hexene, said ethylene-butene comprising at least about 20 weight percent of said butene; and

(b) a rubber selected from the group consisting of halogenated butyl rubber, butyl rubber, ethylene-propylene-diene rubber, polyisoprene, polychloroprene, styrene-butadiene rubber, nitrile rubber, chlorosulfonated polyethylene, and mixtures thereof, said rubber having been non-peroxide vulcanized to a fully cured state in the presence of said plastomeric copolymer.

4,978,718

NOVEL MATTING AGENT AND ITS USE

Ingo Haller; Ernst Spindler; Manfred Heisler, and Willi Kleine, all of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Fed. Rep. of Germany

Division of Ser. No. 766,044, Aug. 15, 1985, Pat. No. 4,914,154. This application Aug. 22, 1986, Ser. No. 899,476

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1984, 3431201; Jul. 3, 1985, 3523788

Int. Cl.[5] C08F *14/06;* C08L *27/06*

U.S. Cl. 525—239 12 Claims

1. A matting agent which is a high molecular weight, gel containing copolymer of vinyl chloride and 1 to 40% by weight of comonomer with a gel content of 10 to 99% by weight, a maximum mercury porosity of 0.10 cm^3/g, a maximum plasticizer absorption of 10%, a particle size parameter d' of 10 to 80 μm and a coefficient of uniformity n greater than 3.

4,978,719

FUNCTIONALIZED ELASTOMERIC POLYMERS

P. K. Wong, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed May 9, 1989, Ser. No. 349,545

Int. Cl.[5] C08F *8/46, 8/30, 8/26, 8/14*

U.S. Cl. 525—275 16 Claims

1. A heat-curable elastomeric composition which comprises an elastomeric polymer having at least two pendant carboxylic acid ester group: wherein the ester moiety is of the formula R'

wherein R′ is propargyl, styrylmethyl or 4-(2-oxazolinyl)benzyl.

4,978,720

OLEFINIC CHLOROSILANE AND OLEFINIC HALIDE FUNCTIONAL GROUP CONTAINING POLYMERS AND METHOD OF FORMING THE SAME

Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 813,980, Dec. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 681,950, Dec. 14, 1984, which is a continuation-in-part of Ser. No. 785,726, Oct. 10, 1985, Pat. No. 4,540,753. This application Jun. 20, 1988, Ser. No. 209,198

Int. Cl.[5] C08F *275/00*

U.S. Cl. 525—288 **11 Claims**

1. A polymerization process for producing a copolymer chain comprising:

A. a first segment comprising one contiguous segment or a plurality of discontinuous segments of a copolymer of ethylene and an alpha-olefin; and

B. a second segment comprising a copolymer of ethylene, an alpha-olefin, and at least one halogen-containing monomer selected from the group consisting of:

(a) an olefinic chlorosilane of the formula

$$SiRR'_xCl_{3-x}$$

wherein

(i) x is the range 0–2;

(ii) R is a Ziegler copolymerizable olefin;

(iii) R′ is a hydrocarbon with 1–30 carbon atoms selected from the group consisting of saturated and unsaturated as well as branched and unbranched aliphatic, aromatic, cyclic, and polycyclic hydrocarbons; and

(b) an olefinic hydrocarbon halide of the formula RR′X wherein:

(i) R is a Ziegler copolymerizable olefin; and

(ii) R′ is a hydrocarbon with 1–30 carbon atoms selected from the group consisting of saturated and unsaturated as well as branched and unbranched aliphatic, aromatic, cyclic, and polycyclic hydrocarbons; and

(iii) X is a halogen;

said second segment constituting less than 50 percent by weight of said copolymer chain, said second segment being in the form of one contiguous segment or a plurality of discontinuous segments;

said at least one halogen-containing monomer being crosslinkable under conditions which do not cross-link said first segments to any substantial extent; said process comprising:

I. forming said first segment by polymerizing a reaction mixture of ethylene and alpha-olefin to form said first segment, and

II. during said polymerization, forming said second segment by incorporating said at least one halogen-containing monomer into said reaction mixture to form said second segment, in an amount such that, at completion of polymerization, said second segment comprises less than 50% of the polymer weight.

4,978,721

FUNCTIONALIZED ELASTOMERIC POLYMERS

Pui-Kwan Wong, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed May 9, 1989, Ser. No. 349,547

Int. Cl.[5] C08F *8/00, 255/06, 279/02, 287/00*

U.S. Cl. 525—289 **16 Claims**

1. A heat-curable, crosslinkable elastomeric composition which comprises an elastomeric polymer having at least two pendant carboxylic acid ester groups wherein the ester moiety is of the formula —R—Z, where R is alkylene of up to 4 carbon atoms and Z is an arylcyclobutene group.

4,978,722

METHOD FOR PRODUCING A PROPYLENE-α-OLEFIN BLOCK COPOLYMER

Nobuaki Goko; Yumito Uehara; Hideshige Kato, and Yukimasa Matsuda, all of Kurashiki, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Continuation of Ser. No. 167,105, Mar. 11, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 407,698

Claims priority, application Japan, Mar. 14, 1987, 62-59774; Mar. 14, 1987, 62-59775; May 18, 1987, 62-120385; May 18, 1987, 62-120386

Int. Cl.[5] C08F *297/08*

U.S. Cl. 525—255 **16 Claims**

1. A method for producing a propylene-α-olefin block copolymer, which comprises:

in a first stage polymerizing propylene in the presence of a catalyst; and then

in a final stage, polymerizing an α-olefin other than propylene, or a combination of propylene and another α-olefin in the gas phase without deactivating the catalyst employed in the previous stage while adding at least one compound selected from the group consisting of an aromatic carboxylic acid ester, a phosphorus ester, an unsaturated dicarboxylic acid diester, an tertiary amine and an amide compound to the gas phase, but substantialy without adding any amount of a titanium-containing solid catalyst component.

4,978,723

PHOSPHONATE-CAPPED POLYMERS

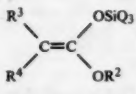
Walter R. Hertler, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 317,507, Mar. 1, 1989, Pat. No. 4,939,211. This application Feb. 27, 1990, Ser. No. 485,709

Int. Cl.[5] C08F *8/12*

U.S. Cl. 525—326.5 **8 Claims**

1. A process for conversion of silyl ketene acetal (SKA) terminated polymers to phosphonic acid terminated polymers by contacting a silyl ketene acetal terminated polymer of the formula



wherein:

each Q, independently, is selected from —R^1, —OR^1, —$N(R^1)_2$ and —SR^1;

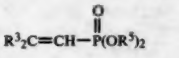
each R^1, independently, is a hydrocarbyl or substituted hydrocarbyl radical;

R^3 is H, hydrocarbyl or substituted hydrocarbyl;

R^2 is hydrocarbyl or substituted hydrocarbyl;

R^4 is a polymeric radical;

with a vinyl phosphonate of the formula



wherein:

R^3 is defined as above;

R^5 is $SiR^1{}_3$;

in the presence of a catalyst which is a source of a selected anion or oxyanion; and optionally, in the presence of a solvent; followed by treating the product with a hydrolizing agent to convert R^5 to H.

4,978,724

METHOD OF PREPARING DERIVATIZED POLYSTYRENE FOR SPECTROSCOPIC STUDIES

Brian R. Clark, Mission Hills, Calif., assignor to Applied ImmuneSciences, Inc., Menlo Park, Calif.

Continuation of Ser. No. 555,038, Nov. 23, 1983, abandoned. This application Dec. 30, 1986, Ser. No. 948,418

Int. Cl.[5] C08F *8/34, 8/24*

U.S. Cl. 525—350 2 Claims

1. A method for producing an article formed from polystryene and functionalized on its surface by substitution with an electrophilic reagent followed by reaction with an additional reagent, said method comprising:

reacting said surface with a reaction mixture comprising said electrophilic reagent in tetramethylene sulfone solvent under conditions and for a time sufficient for said electrophilic reagent to react with said aromatic monomer on the surface of said article to covalently bond substituent groups to said surface to provide a first substituted article;

reacting said first substituted article with a second reaction mixture comprising a nucleophilic reagent in tetramethylene sulfone, dimethyl sulfoxide, water or combination thereof under conditions and for a time sufficient for said nucleophilic reagent to react with said substituent; and

isolating said article from said second reaction mixture.

4,978,725

TOUGHENED POLYOXYMETHYLENE AND SHAPED ARTICLES PRODUCED THEREFROM

Eckart Reske, Hofheim am Taunus, and Ernst Wolters, Königstein/Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 576,114, Feb. 2, 1984, abandoned. This application Sep. 26, 1985, Ser. No. 780,325

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1983, 3303761

Int. Cl.[5] C08L *59/00*

U.S. Cl. 525—399 11 Claims

1. A high impact strength composition consisting essentially of a polyoxymethylene and of 5 to 60% by weight, based on the total mixture, of a polyurethane resin which comprises the product of polyaddition from aliphatic polyhydroxy compounds and aliphatic diisocyanates of the general formula

OCN—R—NCO

in which R is a saturated, linear or branched aliphatic radical having 1 to 20 carbon atoms or a substituted or unsubstituted, saturated, cycloaliphatic divalent radical having 4 to 20 carbon atoms, the polyurethane resin having an elongation at break of 800–1,500% and a Shore hardness A not exceeding 81.

4,978,726

POLYSILOXANES WITH (METH)ACRYLATE ESTER GROUPS LINKED OVER SIC GROUPS AND THEIR USE AS RADIATION-CURABLE COATING MATERIALS FOR SHEET-LIKE CARRIERS

Hardi Döhler, Essen; Jürgen Jachmann, Herne; Christian Weitemeyer, Essen, and Dietmar Wewers, Bottrop, all of Fed. Rep. of Germany, assignors to Th. Goldschmidt AG

Filed May 15, 1989, Ser. No. 352,823

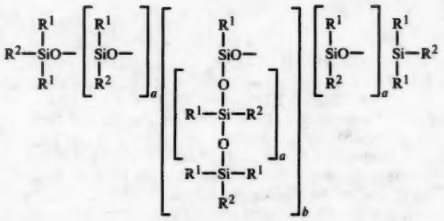
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1988, 3820294

Int. Cl.[5] C08F *283/00*

U.S. Cl. 525—479 11 Claims

1. A polysiloxane with (meth)acrylate ester groups linked over SiC groups which is the reaction product of

(A) a polysiloxane of the general average formula



in which

R^1 groups are the same or different and represent lower alkyl with 1 to 4 carbon atoms or phenyl,

R^2 groups are the same as R^1 or represent R^3 groups, 70 to 100% of the R^3 groups being epoxy-functional groups and 30 to 0% of the R^3 groups being hydrogen or alkyl groups with 2 to 10 carbon atoms which may be optionally substituted with halogen or phenyl groups, with the proviso that the average molecule contains at least 1.8 epoxy groups,

a has a value of 1 to 1,000 and

b has a value of 0 to 10;

(B) (meth)acrylic acid, in 0.4 to 0.9 molar amount based on the number of epoxide groups and

(C) a monocarboxylic acid free of double bonds capable of polymerizing, in an amount effective to react with the remaining epoxide groups.

4,978,727

CYANATO GROUP CONTAINING PHENOLIC RESINS, PHENOLIC TRIAZINES DERIVED THEREFROM

Sajal Das, Parsippany, and Dusan C. Prevorsek, Morristown, both of N.J., assignors to Allied-Signal, Morristown, N.J.

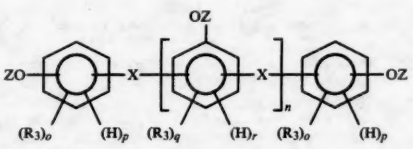
PCT No. PCT/US88/00119, § 371 Date Apr. 12, 1988, § 102(e) Date Apr. 12, 1988, PCT Pub. No. WO88/05443, PCT Pub. Date Jul. 28, 1988

Continuation-in-part of Ser. No. 41,018, Mar. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 821,658, Jan. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 104,700, Oct. 5, 1987, Pat. No. 4,831,086. This PCT application Jan. 15, 1988, Ser. No. 271,198

Int. Cl.[5] C08G *8/28;* C08L *61/06*

U.S. Cl. 525—504 122 Claims

1. A phenolic cyanato resin of the formula:



wherein:

q and r are the same or different and are whole numbers from 0 to 3 with the proviso that the sum of q and r at each occurrence is equal to 3;

Z is —CN, or hydrogen and —CN;

o and p are the same or different at each occurrence and are positive whole numbers from 0 to 4, with the proviso that the sum of o and p is equal to 4;

—X— is a divalent organic radical;

R_3 is the same or different at each occurrence and is a substituent other than hydrogen which is unreactive under conditions necessary to crosslink cyanurate moieties; and

n is a positive whole number,

the resin having substantially no smoke generation during gel time measurement at 155° C.

4,978,728

CATIONIC ELECTRODEPOSITABLE COMPOSITIONS OF PARTIALLY-BLOCKED POLYISOCYANATES AND AMINE-EPOXY RESINS CONTAINING HETEROCYCLIC DIORGANOTIN CATALYSTS

James D. Nichols, and John B. Dickenson, both of Fogelsville, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

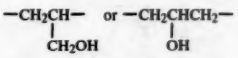
Filed Oct. 20, 1989, Ser. No. 424,379
Int. Cl.[5] C08L 63/02
U.S. Cl. 525—528 12 Claims

1. In a cationic electrodepositable composition comprising an at least partially-blocked polyisocyanate, an amine adduct of an epoxy group-containing resin and an organotin catalyst, the improvement which comprises as the organotin catalyst a compound of the formula

where

R is a C_1–C_8 alkyl or an aryl group,

Y is



X is —S— or —O—.

4,978,729

HIGH MOLECULAR WEIGHT POLYARYLENE SULFIDE PRODUCED FROM POLYARYLENE SULFIDE AND AROMATIC DIHALOGEN COMPOUND

Burkhard Köhler, and Hans-Detlef Heinz, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 7, 1989, Ser. No. 390,229
Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3828058
Int. Cl.[5] C08G 75/16
U.S. Cl. 525—537 4 Claims

1. High molecular weight polyarylene sulfide produced by reaction of polyarylene sulfide with at least one diahalogen compound corresponding to formula (I)

(I)

in which:

R represents C_6–C_{22} alkylene, C_6–C_{22} cycloalkylene or bis-(halomethyl)-arylene; the arylene radical is an m- or p-phenylene radical, or a 1,4-, 1,5-, 1,6-, 1,7-, 1,8-, 2,6- or 2,7-naphthylene radical wherein the arylene radical is optionally substituted with C_1–C_6 alkyl, halomethyl, C_6–C_{22} aryl or halogen substituents, and Hal represents fluorine, chlorine, bromine or iodine.

4,978,730

PROCESS FOR PRODUCING STYRENE-BASED POLYMERS AND CATALYST FOR USE THEREIN

Hiroshi Maezawa; Norio Tomotsu, and Masahiko Kuramoto, all of Ichihara, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Nov. 21, 1988, Ser. No. 274,022
Claims priority, application Japan, Dec. 24, 1987, 62-325391; Jan. 19, 1988, 63-007465; Jan. 19, 1988, 63-007466; Feb. 13, 1988, 63-030048; Mar. 19, 1988, 63-066908; Mar. 19, 1988, 63-066910
Int. Cl.[5] C08F 4/642
U.S. Cl. 526—153 7 Claims

1. A process for producing styrene-based polymers having mainly syndiotactic configuration comprising polymerizing a styrene monomer in contact with a catalyst comprising (A) a titanium compound and (B) a contact product of a methyl group-containing organoaluminum compound and water, wherein the contact product (B) has a high magnetic field component of not more than 50% in the methyl proton signal region due to an aluminum-methyl group (Al—CH_3) bond as determined by the proton nuclear magnetic resonance absorption method.

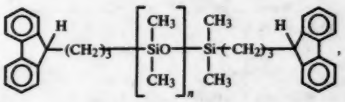
4,978,731

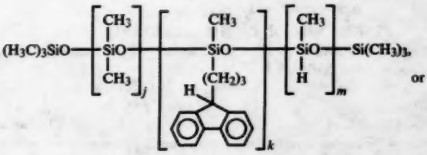
PROCESS FOR FLUORIMETRIC MONITORING OF FUNCTIONAL COATINGS AND COMPOSITIONS AND FLUORESCENT AGENTS THEREFOR

Kurt C. Melancon, and George V. D. Tiers, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

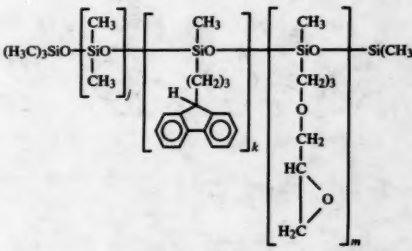
Division of Ser. No. 165,014, Mar. 7, 1988, Pat. No. 4,922,113, which is a division of Ser. No. 883,926, Jul. 19, 1986, abandoned.
This application Feb. 2, 1990, Ser. No. 474,461
Int. Cl.[5] C08G 77/06
U.S. Cl. 528—15 5 Claims

1. A polymer having the formula





or



wherein

j, k and m are integers the sum of which is about 10 to 10,000, k being from 0.01 to 10% of the sum of j, k and m, m being

from zero to 99.5% of the sum of j, k and m, and n being an integer from about 5 to 10,000.

4,978,732

COATED SUPPORTS WITH ULTRA-THIN, SINGLE-LAYER OR MULTI-LAYER COATING, PROCESS FOR THEIR PRODUCTION AND POLYURETHANES AS INTERMEDIATES FOR THE COATED SUPPORTS

Rolf Wehrmann; Heinrich-Christian Schopper, both of Krefeld, Fed. Rep. of Germany, and Dittmar K. Nerger, Pittsburgh, Pa., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

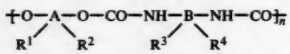
Filed Aug. 1, 1989, Ser. No. 387,748

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827438

Int. Cl.[5] C08G *18/32*

U.S. Cl. 528—71 **10 Claims**

1. A coated support with ultra-thin, single-layer or multi-layer coating of organic polymer material, characterized in that, as polymer, a polyurethane of the structure



is used in which

A is the skeleton of an aliphatic, araliphatic or aromatic diol,

B is the skeleton of an aliphatic, araliphatic or aromatic diisocyanate,

n assumes values from 2–150 preferably 3–100, and

at least one of the substituents R^1 to R^4 represents an essentially normal-chain aliphatic radical and the others in each case denote hydrogen, the aliphatic radical having at least 4 carbon atoms and the number of carbon atoms from the terminal methyl group of the aliphatic radical via the skeleton A or B up to the urethane linkage being 6 to 40, it being possible for this chain of carbon atoms to contain an O atom or N atom in the region of the skeleton A or B, and it being further possible for R^1 and R^2 jointly to form an alkylene chain and for R^3 and R^4 jointly to form an alkylene chain.

4,978,733

POLYAMIDE-POLYAMIDE-POLYIMIDE AND POLYBENZOXAZOLE-POLYAMIDE-POLYIMIDE POLYMER HAVING AT LEAST ONE FLUORINE-CONTAINING LINKING GROUP

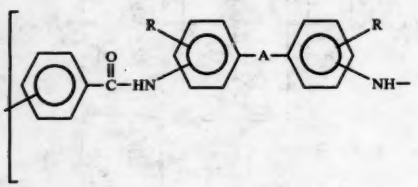
Dinesh N. Khanna, Warwick, R.I., assignor to Hoechst Celanese Corp., Somerville, N.J.

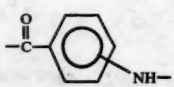
Filed Mar. 9, 1989, Ser. No. 321,024

Int. Cl.[5] C08G *73/22*

U.S. Cl. 528—170 **13 Claims**

1. A polyamide-polyamide-polyamide polymer comprising at least one recurring group of the structure:





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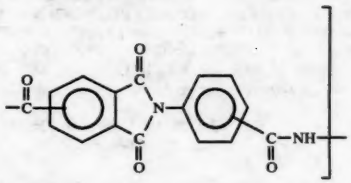
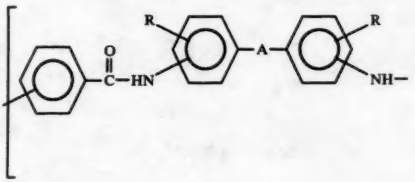
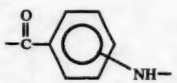
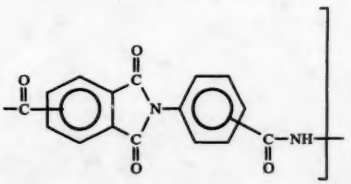


wherein A is selected from the group consisting of SO_2, O, S, CO, C_1 to C_6 alkylene,







or A represents a bond directly linking the two aromatic groups, R is selected from the group consisting of hydroxy and C_1 to C_4 alkoxy, said polymer having an inherent viscosity of at least 0.1 dl/g as measured from a solution of the polymer in dimethylacetamide at 25° C. at a polymer concentration of 0.5 weight percent.

4,978,734

POLYAMIDE-POLYAMIDE AND POLYBENZOXAZOLE-POLYAMIDE POLYMER

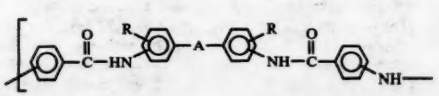
Dinesh N. Khanna, West Warwick, R.I., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Mar. 9, 1989, Ser. No. 321,039

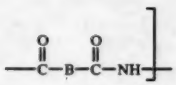
Int. Cl.[5] C08G *73/22*

U.S. Cl. 528—184 **19 Claims**

1. A polyamide-polyamide polymer comprising at least one recurring group of the structure:



-continued



wherein A is selected from the group consisting of SO_2, O, S, CO, C_1 to C_6 alkylene, CF_3

CF_3 and CF_3

phenyl, or A represents a bond directly linking the two aromatic groups, R is selected from the group consisting of hydroxy and C_1 to C_4 alkoxy, B is a substituted or unsubstituted alkylene, alicyclic or divalent aromatic radical, the latter being selected from the group consisting of a benzene nucleus, polyphenyl nuclei having up to four phenyl rings and naphthalene nuclei, said polymer having an inherent viscosity of at least 0.05 dl/g as measured from a solution of the polymer in dimethylacetamide at 25° C. at a polymer concentration of 0.5 weight percent.

4,978,735

THERMOTROPIC LIQUID CRYSTALLINE AROMATIC POLYESTER FROM 3,3'-DIPHENYL-4,4'-DIHYDROXY DIPHENYL

L. Lawrence Chapoy, Lesa; Alfredo Coassolo, and Marco Foá, both of Novara, all of Italy, assignors to Himont Italia S.r.l., Milan, Italy

Filed Sep. 5, 1989, Ser. No. 402,348

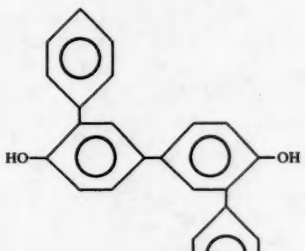
Claims priority, application Italy, Sep. 7, 1988, 21843 A/88

Int. Cl.[5] C08G *63/54, 63/18, 63/00, 63/02*

U.S. Cl. 528—193 **10 Claims**

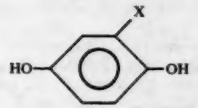
1. A thermotropic liquid crystalline aromatic polyester comprising:

(a) 30–90% by moles, with respect to the total of the aromatic diols, of a unit derived from 3,3'-diphenyl-4,4'-dihydroxydiphenyl of general formula:



(1)

(b) 70–10% by moles, with respect to the total of the aromatic diols, of at least a unit derived from hydroquinones of general formula:



(2)

wherein X represents a halogen or an alkyl radical having from 1 to 6 carbon atoms, an aralkyl radical containing at least 7 carbon atoms, an aryl radical containing from 6 to 18 carbon atoms or a cycloalkyl radical containing from 6 to 12 carbon atoms;

(c) at least a unit derived from bicarboxylic acids of general formula:

$$HOOC—R_1—COOH \quad (3)$$

wherein R_1 represents a cycloalkyl, a simple, double or condensed, aryl radical containing from 6 to 18 carbon atoms, optionally substituted with halogens or alkyl radicals having 1 to 6 carbon atoms;

(d) optionally at least a unit derived from hydroxyacids of general formula:

$$HO—AR_1—(CH=CH)_n—COOH \quad (4)$$

wherein Ar_1 represents a simple, double or condensed aryl radical containing from 6 to 18 carbon atoms, optionally substituted with halogens, or alkyl radicals having 1 to 6 carbon atoms, and n is equal to zero or to 1.

4,978,736

POLYAMIDEIMIDE POLYMERS

Pen-Chung Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 279,610, Dec. 5, 1988, abandoned. This application Jan. 2, 1990, Ser. No. 459,920

Int. Cl.[5] C08G *8/02, 2/00, 73/10, 69/26*

U.S. Cl. 528—220 **35 Claims**

1. A process of producing a linear alternating poly(amideimide) polymer by contacting under polymerization conditions in a liquid phase reaction diluent

(1) a spirodilactam precursor of up to 30 carbon atoms inclusive selected from a 4-oxoheptanedioic acid compound,

(2) a primary diamine compound of up to 30 carbon atoms wherein the amino groups are not located on adjacent carbon atoms, and

(3) a tetracarboxylic acid compound having up to 30 carbon atoms wherein each of four separate carbon atoms is substituted with a carboxy group or part of an anhydride group, each of the four carbon atoms being adjacent to another carbon atom so substituted.

4,978,737

COPOLYIMIDES DERIVED FROM 2,2-BIS (AMINO PHENYL) HEXOFLUOROPROPANE

Rohitkumar H. Vora, West Warwick, R.I., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Jul. 12, 1988, Ser. No. 217,928

The portion of the term of this patent subsequent to Jul. 12, 2088, has been disclaimed.

Int. Cl.[5] C08G *63/00, 12/00, 69/26*

U.S. Cl. 528—220 **13 Claims**

1. A polyimide polymer soluble in N-methyl pyrrolidone consisting essentially of the imidized condensation product of:

(a) a diamine selected from the group consisting of 2,2-bis(3-aminophenyl)hexafluoropropane and 2,2,-bis(4-aminophenyl)hexafluoropropane; and a mixture of dianydrides comprising:

(b) pyromellitic dianhydride; and

(c) at least one additional dianhydride selected from the group consisting of bis (3,4-dicarboxyphenyl) ether dianhydride, 3,3',4,4' benzophenone tetracarboxylic dianhy-

dride, 3,3',4,4' diphenyl tetracarboxylic acid dianhydride and 2,2 bis (3,4 dicarboxy phenyl) hexafluoropropane dianhydride

the relative proportions of said dianhydrides present in the mixture being from about 35 to about 75 mole percent of (b) and from about 25 to about 65 mole percent of (c).

4,978,738

HIGH MOLECULAR WEIGHT, THERMALLY SOLUBLE POLYIMIDES

Werner H. Mueller, Corpus Christi, Tex.; Rohitkumar H. Vora, and Dinesh N. Khanna, both of West Warwick, R.I., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Jul. 12, 1988, Ser. No. 217,914

The portion of the term of this patent subsequent to Jun. 27, 2090, has been disclaimed.

Int. Cl.[5] C08C *2/00;* **C08G** *12/00, 63/00, 69/26*

U.S. Cl. 528—220 **20 Claims**

1. A high molecular weight soluble polyimide condensation product composition produced from a diamine selected from the group consisting of 2,2-bis (3-aminophenyl) hexafluoropropane, 2,2-bis (4-aminophenyl) hexafluoropropane and mixtures thereof and an equimolar amount of dianhydride consisting essentially of a compound or mixture selected from the group consisting of bis-(3,4 dicarboxyphenyl) ether dianhydride, 3,3',4,4' diphenyl tetracarboxylic acid dianhydride, and 3,3',4,4' benzophenone tetracarboxylic acid dianhydride, said polyimide optionally containing recurring units of the residue of 2,2-bis (3,4 dicarboxyphenyl) hexafluoropropane dianhydride and wherein said polyimide has a molecular weight of at least about 90,000, a polydispersity of from about 1.7 to about 2.6, thermal stability to at least about 525° C. and an inherent viscosity of at least about 0.8.

4,978,739

PROCESS FOR PREPARING POLYARYLATE FROM AN ESTER DERIVATIVE OF A DIHYDRIC PHENOL

Michael J. Amone, Monmouth Junction, and Barry D. Dean, Belle Mead, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Filed Aug. 3, 1989, Ser. No. 389,178

Int. Cl.[5] C08G *8/02, 63/00, 67/00*

U.S. Cl. 528—271 **22 Claims**

1. An improved diester process for preparing a polyarylate polymer which process comprises reacting at least one aromatic dicarboxylic acid and a diester derivative of a dihydric phenol and an ester-forming agent having no hydrogen atoms on a carbon atom in a position alpha to a carbonyl group of the ester-forming agent.

4,978,740

COPOLYESTER AND POLYESTER FILM HAVING SAID COPOLYESTER AS SUBBING LAYER

Hitoshi Kawamoto; Yoshimichi Ozawa; Hiroshi Naito, all of Hohfu; Yoshihiro Wada, Tokyo; Toshiaki Yamazaki, Tokyo, and Ichiya Harada, Tokyo, all of Japan, assignors to Kanebo, Ltd. and Konica Corporation, both of Tokyo, Japan

Filed Dec. 26, 1989, Ser. No. 456,304

Claims priority, application Japan, Dec. 28, 1988, 63-332086

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—272 **22 Claims**

1. A copolyester of dicarboxylic acids and at least one glycol, comprising at least the following four components

(A) terephthalic acid and/or its ester forming derivative (terephthalic acid component) and isophthalic acid and/or its ester forming derivative (isophthalic acid component) in a molar ratio of 30/70 to 70/30;

(B) 5 to 15 mole % of a dicarboxylic acid having a sulfonate group and/or its ester forming derivative based on all the dicarboxylic acid components;

(C) 10% or more of an alicyclic dicarboxylic acid and/or its ester forming derivative based on all the dicarboxylic acid components; and

(D) 50 mole % or more of ethylene glycol based on all the glycol components.

4,978,741

METHOD FOR PREPARING ESSENTIALLY HAZE-FREE ISOPHTHALIC ACID- AND POLYMETHYLOLALKANOIC ACID-CONTAINING RESINS

Paul E. Eckler, Terre Haute, Ind., assignor to Questra Chemicals Corp., Atlanta, Ga.

Continuation of Ser. No. 149,842, Jan. 29, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 449,147

Int. Cl.[5] C08G *63/06;* **C07C** *69/66*

U.S. Cl. 528—279 **23 Claims**

1. A method of producing essentially haze-free isophthalic acid-and polymethylolalkanoic acid-containing resins comprising:

reacting isophthalic acid, a polymethylolalkanoic acid, and a polyol in the presence of a catalytically effective amount of a catalyst selected from the group consisting of stannous oxalate, dibutyltin oxide, and tetrabutyl titanate at a temperature of between about 150° C. and 230° C. to produce essentially haze-free resins having an acid number of at least about 30.

4,978,742

POLYMERS PREPARED FROM 2-(3-AMINOPHENYL)-2-(4-AMINOPHENYL) HEXAFLUORO PROPANE

Rohitkumar H. Vora, West Warwick, R.I., and Werner H. Mueller, Corpus Christi, Tex., assignors to Hoechst Celanese Corp., Somerville, N.J.

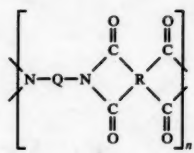
Filed Sep. 30, 1988, Ser. No. 252,428

The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.

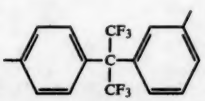
Int. Cl.[5] C08G *12/00, 63/00, 69/26*

U.S. Cl. 528—353 **13 Claims**

1. A polyimide polymer comprising recurring groups having the structure:



wherein n is the number of repeating groups, R is a tetravalent aromatic organic radical, and Q is the residuum having the formula:



4,978,743

PROCESS FOR THE CONTINUOUS, COUNTER FLOW/DIRECT FLOW EXTRACTION OF POLYAMIDES

Harald Selbeck; August Horsthemke; August Böckmann, all of Krefeld, and Frank Weber, Duisburg, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,361

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732170

Int. Cl.[5] C08G *69/46*

U.S. Cl. 528—499 **9 Claims**

1. Process for the continuous extraction of low molecular weight components from polycaprolactam by means of aqueous extraction liquid, which comprises

adding the polycaprolactam in granular form to the top of a two-part extraction tube in which the upper part is connected to the lower part by a transition tube of smaller diameter, the diameter of the transition tube being 5–50% of the diameter of the extraction tube, wherein counterflow extraction is carried out in the upper part below the boiling point of water and concurrent flow extraction is carried out in the lower part, by means of the entire extraction water being introduced at the lower end of the upper part of the extraction tube and a part stream of this liquid being carried upwards while the other part stream is carried downwards through the transition tube into the lower part of the extraction tube, wherein the concurrent extraction in the lower part of the extraction tube is at temperatures above the boiling point of water at normal pressure, and the concurrent extraction is under the hydrostatic pressure of the extraction column with the amount of extraction fluid flowing concurrently with the polycaprolactam being 0.5 to 10 times the quantity passing through said lower part per unit time,

removing extraction fluid at both the upper end and the lower end of the extraction tube and removing polycaprolactam from the bottom of the lower part of the extraction tube whereby the polycaprolactam removed contains less than 0.05% of dimer.

4,978,744

SYNTHESIS OF DOLASTATIN 10

George R. Pettit, Paradise Valley, and Sheo B. Singh, Tempe, both of Ariz., assignors to Arizona Board of Regents, Tempe, Ariz.

Filed Jan. 27, 1989, Ser. No. 304,572

Int. Cl.[5] C07K *5/10, 7/06*

U.S. Cl. 530—330 **24 Claims**

1. The method of synthesizing dolastatin 10 comprising the steps of forming a solution of Z-(S,S)-isoleucine and methyl iodide in tetrahydrofuran; cooling said solution to about 0° C.; stirring said cooled solution under argon; adding sodium hydride to said stirred cooled solution to form a suspension; stirring said suspension at room temperature; adding ethyl acetate and ice water to said stirred suspension to form an aqueous layer; washing aqueous layer with ether; acidifying said washed aqueous layer with acid at 0° C.; extracting said acidified aqueous layer with ethyl acetate; and washing said extract; removing said solvent from said extract to provide N-Z-N-methyl- (S,S)- isoleucine; dissolving said N-Z-N-methyl-(S,S)- isoleucine in tetrahydrofuran at 0° C. under argon; adding borane-tetrahydrofuran complex to said solution with stirring; extracting the product from said solution with ethyl acetate; evaporating the solvent from extracted product to form an oil; filtering said oil through a column of silica gel; eluting said column with hexane-acetone (7:3) to form N-Z-N-methyl-(S,S)-isoleucinol; admixing said N-Z-N-methyl-(S,S)-isoleucinol with triethylamine in dimethylsulfoxide at room temperature; cooling the mixed solution to 0° C.; adding sulfur trioxide-pyridine complex to said solution under argon; extracting the aldehyde from said solution with ether; washing said ethereal solution successively with citric acid, water, and sodium bicarbonate to yield chromotographically pure N-Z-N-methyl- (S,S)-isoleucinal; preparing a solution of lithium diisopropylamide from n-butyllithium and diisopropylamine in tetrahydrofuran at −78° C.; warming said solution to −20° C.; recooling said solution to −78° C.; adding tert-butyl acetate to said recooled solution; stirring said solution while rewarming said solution to −20° C.; recooling said solution to −78° C. and adding said chromatographically pure N-Z-N-methyl-(S,S)-isoleucinal thereto; treating the resulting mixture with ice water; extracting the mixture with ether; drying said extract; solvent evaporating said dry extract to yield a viscous oil; chromatographing and eluting said viscous oil with hexane-acetone (47:3) to yield tert-butyl(3S,4S, 5S)-3-hydroxy-4-(N-Z-N-methyl)-amino-5-methyl-heptanoate and tert-butyl (3R,4S,5S)-3-hydroxy-4-(N-Z-N-methyl)-amino-5-methyl-heptanoate; adding boron trifluoride etherate to a cooled and stirred solution of tert-butyl (3R,4S,5S)-3-hydroxy-4-(N-Z-N-methyl) -amino-5-methyl-heptanoate in dichloromethane under argon; thereafter adding an anhydrous solution of diazomethane in dichloromethane to said solution; filtering the polymethylene side products from said solution to form a filtrate; concentrating said filtrate; chromatographing said concentrated filtrate on a silica gel column; eluting said column with hexane-acetone (97:3) to yield tert-butyl (3R,4S,5S)-3-methoxy-4-(N-Z-N-methyl) -amino-5-methyl-heptanoate; admixing trifluoroacetic anhydride in dichloromethane into a cooled −78° C. solution of dimethylsulfoxide in dichloromethane with stirring; adding N-Boc-S-prolinol in dichloromethane to said cool stirred mixture and continue stirring for about an hour; adding triethylamine to said solution; warming said solution to −20° C.; extracting said solution with ether to form an ethereal solution; washing and concentrating said ethereal solution to form an oil; dissolving said oil in acetone; filtering said oil-acetone solution through a silica-gel column; eluting said column with hexane-acetone (93:7) to yield N-Boc-S-prolinal; adding 2-S-Propionyloxy-1,1,2-triphenylethanol to a solution of lithium diisopropylamide in tetrahydrofuran at −78° C. under argon to form a reaction mixture; permitting said reaction mixture to warm to room temperature over two hours to form a yellow solution; cooling the yellow solution to −95° C.; adding freshly synthesized magnesium bromide to said cooled yellow solution; thereafter adding a solution of Boc-S-prolinal in tetrahydrofuran to said yellow solution and allowing the reaction therebetween to proceed for two hours at −95° C. under methanol-liquid nitrogen; terminating said reaction with saturated aqueous ammonium chloride; warming said mixture to 0° C.; adding ether to said mixture to form an ethereal solution; washing, drying and solvent evaporating said ethereal solution to provide a glassy solid; dissolving said glassy solid to form a solution; adsorbing said solution on silica gel; chromatographing said adsorbed silica gel; and eluting said chromatographed silica gel to provide N-Boc-2S-3′-[2″ethoy-(1″-hydroxy- ″,1″,2″-triphenyl) 2′S-methyl-′R-hydroxy- propionate]-pyrrolidine; methylating said N-Boc-2S-3, propionate-pyrrolidine in dichloromethane with boron trifluoride etherate and diazomethane in anhydrous dichloromethane; eluting said methylated pyrrolidine with hexane-acetone (9:1) to provide N-Boc-2S-3′-[2″-ethoxy(1″-hydroxy-1″,1″,2″-triphenyl) 2′S-methyl-3′R-methoxy-propionate]-pyrrolidine; adding potassium tert-butoxide to a solution of said (2′S,3′R) ester in tetrahydrofuran with stirring until the solution turns bright yellow; warming the bright yellow solution to −15° C. and stopping the epimerization thereof by the addition of sufficient saturated aqueous citric acid thereto to dilute said solution; extracting said solution with dichloromethane to form a combined extract; washing said extract and removing the solvent therefrom to provide a clear oil; chromatographing said yellow oil on silica gel; eluting said silica gel to provide N-Boc-2S-3′-[2″ethoxy(1″hydroxy- 1″,1″, 2″-triphenyl) 2′S-methyl-3′R-methoxy-propionate]-pyrrolidine; forming a solution of N-Boc-S-phenylalaninol in anhydrous dimethylsulfoxide-triethylam;ine; oxidizing said solution with sulfur trioxide pyridine complex; adding water to said oxidized solution to precipitate N-Boc-S-phenylalaninal; forming a solution of N-Boc-S-phenylalaninal and 2-aminoethanethiol in anhydrous

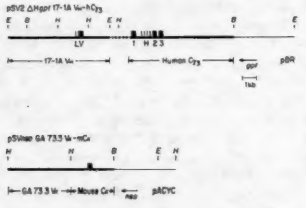
benzene; stirring said solution under argon for four hours; removing the solvents and excess reagents from said stirred solution by filtration through a silica gel pad to form a residue; crystallizing said residue to form 2-(N-Boc-1'S-amino-2'-phenyl-ethyl)-2-(R,S)-thiazolidine [N-Boc-2(3),4(5)-tetrahydro-dolaphenine]; forming a suspension of battery grade manganese dioxide in anhydrous benzene; adding 1'-ethyl (N-Boc-1'S-amino-2'-phenyl)-2(R,S)-thiazolidine [N-Boc-2(3),4(5)-tetrahydro-dolaphenine] in benzene to said suspension to form a mixture; stirring said mixture under argon at 55° C. for 24 hours; adding additional manganese dioxide with continued stirring; filtering said stirred solution through silica gel; washing said silica gel sequentially with benzene, ethyl acetate, chloroform and chloroform acetone (1:1) to form a combined eluant; evaporating said combined eluant to form a residue; chromatographing said residue on a silica gel column; eluting said column with ethyl acetate-hexane; and crystallizing from said eluant granules consisting of 2-(1'S-Boc-amino-2'-phenyl-ethyl)-2-thiazole[N-Boc-S-dolaphenine].

4,978,745

IMMUNOREACTIVE HETEROCHAIN ANTIBODIES

Hubert J. P. Schoemaker, Devon, and Lee K. Sun, Media, both of Pa., assignors to Centocor, Inc., Malvern, Pa.

Filed Nov. 23, 1987, Ser. No. 123,864
Int. Cl.[5] C07K 13/00
U.S. Cl. 530—387 6 Claims



1. An immunoreactive heterochain anti-17-1A antibody or antibody fragment, comprising at least one heavy chain variable region derived from a first antibody and at least one light chain variable region derived from a second antibody, wherein the chain regions are associated to form a functional antigen binding site, such that the binding affinity differs from that of either parental antibody and the first and second antibodies are specific for a 17-1A antigen or epitope.

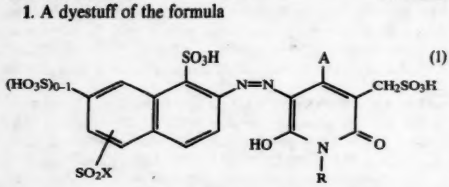
4,978,746

REACTIVE NAPHTHYL AZA PYRIDONE DYESTUFFS

Karl-Josef Herd, Odenthal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 161,547, Feb. 29, 1988. This application Nov. 20, 1989, Ser. No. 439,895
Claims priority, application Fed. Rep. of Germany, Mar. 10, 1987, 3707550
Int. Cl.[5] C09B 62/085, 62/245, 62/51; D06P 1/384
U.S. Cl. 534—632 12 Claims

1. A dyestuff of the formula



(1)

wherein

A=H, unsubstituted C_1–C_4-alkyl, C_1–C_4-alkyl substituted by a substituent selected from the group consisting of OH, SO_3H and COOH or phenyl or COOR',

R'=H or C_1–C_4-alkyl,

X=—CH=CH_2 or —CH_2C_2—Y,

Y=—OSO_3H, —SSO_3H, —$OCOCH_3$ or Cl,

R=H, unsubstituted C_1–C_4-alkyl, or C_1–C_4 alkyl substituted by a substituent selected from the group consisting of Cl, OH, SO_3H, OSO_3H, COOH, OC_1–C_4 alkyl and NR''Z, wherein

R''=H, unsubstituted C_1–C_4-alkyl or C_1–C_4-alkyl substituted by a substituent selected from the group consisting of OH, SO_3H, COOH and OSO_3H, and Z=a heterocyclic fiber reactive radical selected from the group consisting of 2,4-dichlorotriazin-6-yl, monohalogeno-sym.-triazinyl, monohalopyrimidinyl, dihalogenopyrimidinyl and trihalogenopyrimidinyl.

4,978,747

COLORANTS OBTAINED BY REACTING A NH_2-CONTAINING DYESTUFF WITH A DIISOCYANATE FOLLOWED BY REACTION OF THIS ADDUCT WITH A DIAMINE

Karl-Arnold Weber, Betzweiler; Hermann Henk, Cologne; Klaus Kunde, Neunkirchen; Jochen Westphal, Dusseldorf, and Klaus Wunderlich, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 13, 1989, Ser. No. 337,497
Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814531
Int. Cl.[5] C09B 43/00, 43/55, 69/10; C07D 11/02
U.S. Cl. 534—735 12 Claims

1. A colorant obtained by reacting a dyestuff which is free from ionic groups and which has ≧2 NH_2 groups with such an amount of a aliphatic diisocyante so as to form a reaction product which contains at least two free NCO groups, and subsequently reacting this reaction product with a (cyclo)aliphatic diamine to form an adduct.

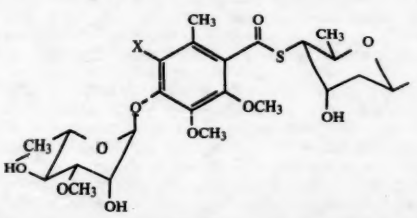
4,978,748

INTERMEDIATE AND PROCESS FOR PRODUCING THE ANTIBACTERIAL AND ANTITUMOR AGENTS LL-E33288ε-I AND LL-E33288EPSILON-BR

George A. Ellestad, Pearl River, N.Y., and William J. McGahren, Demarest, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Feb. 29, 1988, Ser. No. 161,626
Int. Cl.[5] C07H 5/00, 15/00
U.S. Cl. 536—17.5 9 Claims

1. A process for producing LL-E33288ε-I, which comprises reacting LL-33288γ_1-I having the structure:



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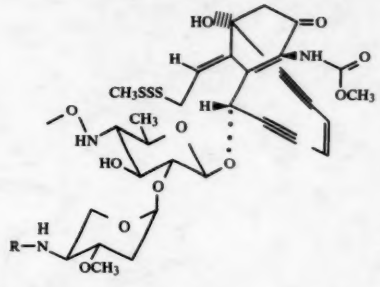
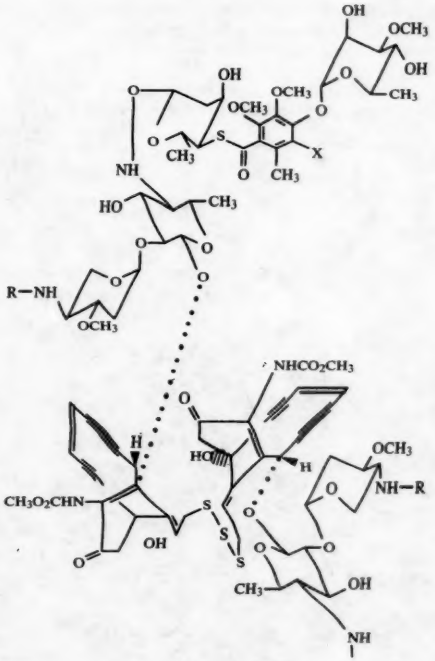
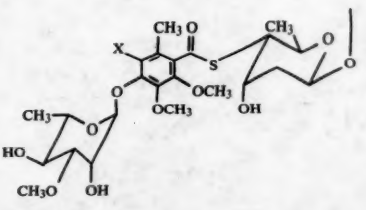


wherein X=I and R=CH_2CH_3

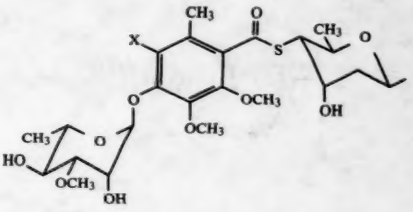
with triphenylphosphine is dichloromethane at ice bath temperature, following by warming to room temperature, collecting the so formed dethiomethylγ_1-I, having the structure:

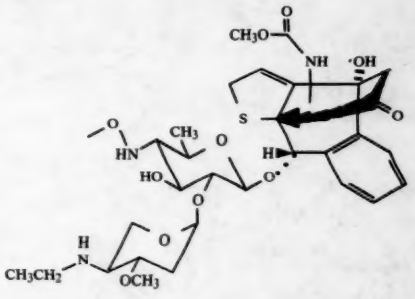




wherein X=I and R=CH_2CH_3

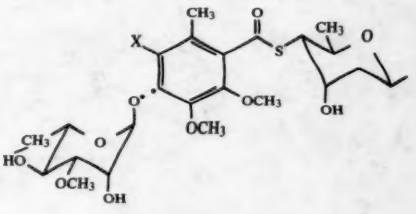
reacting the dethiomethyly-I with triphenylphosphine in methanol with slight warming and collection of the so formed LL-E33328ϵ-I having the structure:

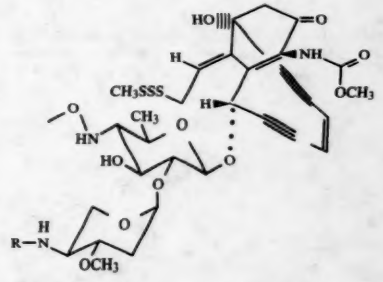




wherein X=I.

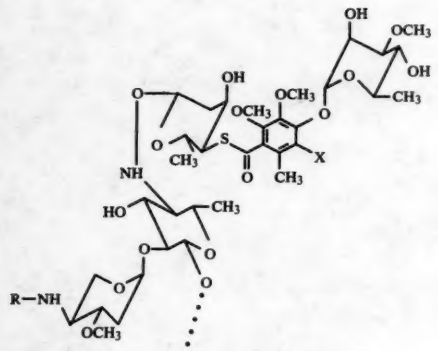
3. A process for producing LL-E33288ϵ-I which comprises reacting LL-E33288δ_1-I having the structure:

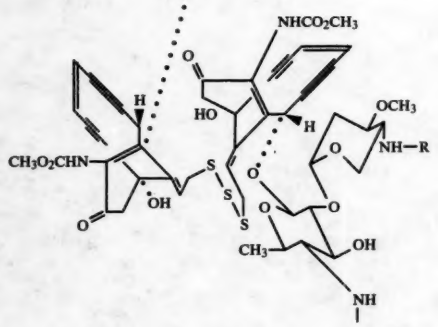


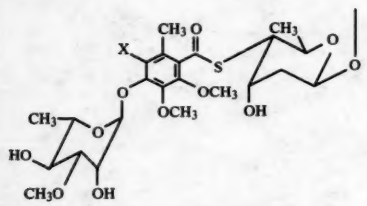


wherein X=I and R=CH_3,

with triphenylphosphine in dichloromethane at ice bath temperature, followed by warming to room temperature, collecting the so formed dethiomethylδ_1-I, having the structure:

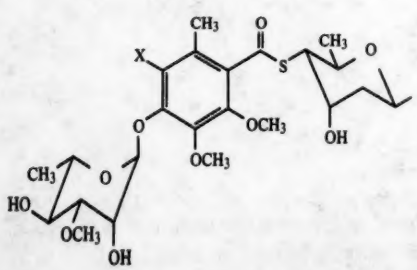






wherein X=I and R=CH_3

reacting the dethiomethylδ_1-I with triphenylphosphine in methanol with slight warming and collection of the so formed LL-E33288ϵ-I having the structure:



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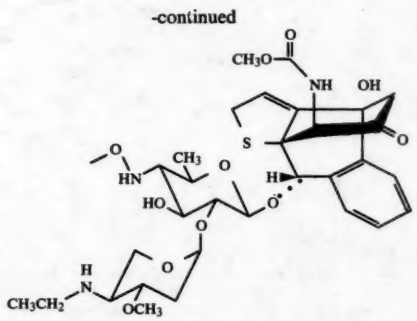


wherein X=I.

5. The compound dethiomethylγ_1-I which has:

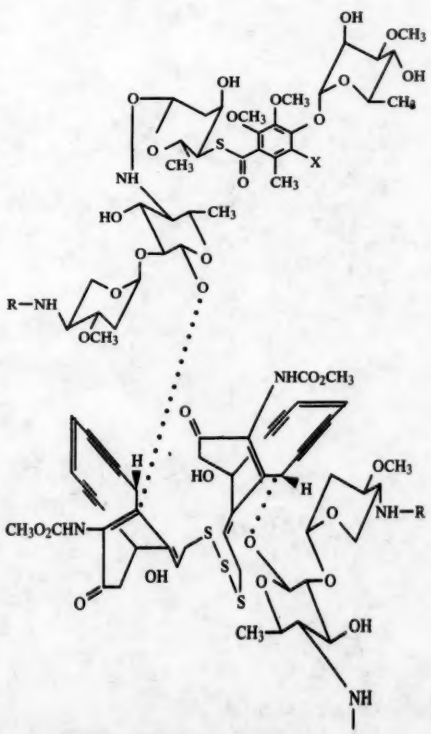
(a) a molecular formula: $C_{108}H_{142}N_6O_{42}I_2S_5$;

(b) an elemental analysis: C, 46.46; H, 5.80; N, 3.01; I, 9.10; and S, 5.74;

(c) a molecular weight: 2608.4 (FABMS);

(d) a proton magnetic resonance spectrum as shown in FIG. I; and

(e) a structure



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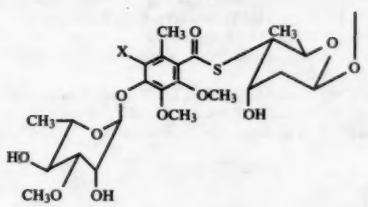


wherein X=I and R=CH_2CH_3.

4,978,749

NON-RADIOACTIVE LABELLED SINGLE-STRANDED PROBE, METHOD FOR MANUFACTURING IT AND METHOD FOR DETECTING A SPECIFIED NUCLEOTIDE SEQUENCE USING THIS PROBE

Avrameas Stratis, Paris; Hiroshi Sakamoto, Meudon; Francois Traincard, Paris; Tuyen Vo Quang, Paris; Jean-Luc Guesdon, Paris, and Therese Ternynck, Paris, all of France, assignors to Institute Pasteur and Centre National De La Recherche Scientifique, both of Paris, France

Continuation of Ser. No. 33,193, Apr. 2, 1987, abandoned. This application Jul. 11, 1989, Ser. No. 378,507

Claims priority, application France, Apr. 4, 1986, 86 04913

Int. Cl.[5] C07H *21/04, 5/02;* **C12Q** *1/68;* **G01N** *33/531;* **C12N** *15/11*

U.S. Cl. 536—27 **9 Claims**

1. A recombinant probe comprising a single-stranded nucleic acid having a single polarity and

(a) a first nucleotide sequence for hybridization with another nucleotide sequence that is to be detected, and

(b) a second nucleotide sequence that comprises a nucleotide sequence of a single-stranded phage,

wherein said recombinant probe comprises a plurality of a modified base, said modified base comprising a corresponding natural base modified by a halogenated substituent, and

wherein the number of said modified bases in said nucleic acid constitutes more than 60% of the sum of the modified bases and said corresponding natural base, and

wherein said nucleic acid is capable of replication in a host cell, and capable of existing in a double-stranded form during replication in the host cell, and said double-stranded form is incapable of being excreted outside the host cell.

4,978,750

PROCESS FOR THE PRODUCTION OF HETEROPOLYSACCHARIDES HAVING IMPROVED PROPERTIES, MORE ESPECIALLY XANTHAN

Michaela Wilke, Schneverdingen; Klaus Szablikowski, and Klaus Balser, both of Walsrode, all of Fed. Rep. of Germany, assignors to Wolff Walsrode AG, Walsrode, Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 329,995

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812682

Int. Cl.[5] C08B *37/00*

U.S. Cl. 536—114 **15 Claims**

1. A process for the production of cellulase-free heteropolysaccharides, comprising

(a) adjusting a solution containing a heteropolysaccharide to a pH valve in the range of 1 to 3,

(b) subsequently carrying out a heat treatment at an elevated temperature and

(c) introducing the resultant product into a turbulent precipitation bath.

4,978,751

LOW-CALORIE SWEETENERS OF FRUCTOSYL OLIGOSACCHARIDES AND THE FOOD OR DIETETIC PRODUCTS OR DRINKS CONTAINING THEM

Jacques Biton; Gerard Gelif, both of La Croix Saint Ouen; Jean-Marc Michel, Compiegne; Francois B. Paul, Toulouse, and Pierre F. Monsan, Blagnac, all of France, assignors to Roussel-Ulcaf, Paris, France

Filed Apr. 13, 1989, Ser. No. 337,641

Claims priority, application France, Apr. 14, 1988, 88 04944

Int. Cl.[5] C07H *1/00;* **C08B** *37/00;* **A61K** *45/00;* **A23L** *1/00*

U.S. Cl. 536—123 **9 Claims**

1. A method for reducing the calorie intake of a human or animal subject by partial or total replacement of calorific sugars present in a food or drink product to be consumed by the subject by one or more fructosyl oligosaccharides containing from 3 to 8 carbohydrate units joined by beta bonds in an amount sufficient to reduce the calorie intake of the subject by 5 to 20% in comparison with the calorie intake of the subject consuming a product containing the calorific sugars.

4,978,752

CRYSTALS OF CEPHEM HYDROCHLORIDE

Yoshiharu Maeda; Yukio Mizuno, both of Osaka; Akira Nakatani, Hyogo, and Mitsuhisa Yamano, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Nov. 22, 1988, Ser. No. 274,976

Claims priority, application Japan, Dec. 4, 1987, 62-308351

Int. Cl.[5] C07D *501/46;* **A61K** *31/545*

U.S. Cl. 540—222 **10 Claims**

1. Crystalline 7β-[(Z)-2-(5-amino-1,2,4-thiadiazol-3-yl)-2-methoxyiminoacetamido]-3-(1-imidazo[1,2-b]-pyridazinium)-methyl-3-cephem-4-carboxylate hydrochloride or a crystalline solvate thereof.

4,978,753

7-PHENYLPYRIMIDO[1,2-ALPHA][1,4]BENZODIAZEPIN-3(5H)-ONES

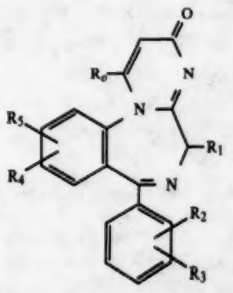
Jacob Szmuszkovicz, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 323,765, Jan. 15, 1973, abandoned. This application Nov. 2, 1989, Ser. No. 430,751

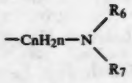
Int. Cl.[5] C07D *487/08*

U.S. Cl. 540—559 **23 Claims**

1. A phenylpyrimido[1,2-a][1,4]benzodiazepin-3(5H)-one of the formula



wherein R_0 is selected from the group consisting of hydrogen, alkyl of 1 to 3 carbon atoms, inclusive, hydroxymethyl, —COOR in which R is alkyl defined as above, and



in which n is a number of 1 to 4 and R_6 and R_7 are alkyl defined as above; wherein R_1 is selected from the group consisting of hydrogen, hydroxy, acetoxy, propionoxy, —OCO—CH-2—CH_2COOH, —OCO—CH_2—CH_2—COOR in which R is alkyl defined as above; wherein R_2, R_3, R_4 and R_5 are selected from the group consisting of hydrogen, halogen, nitro, cyano, trifluoromethyl, and alkyl and alkoxy, in which the carbon moiety is of 1 to 3 carbon atoms, inclusive, and dialkylamino in which alkyl is defined as above, and the pharmacologically acceptable acid addition salts and N-oxides thereof, with the proviso that the compound cannot be 9-chloro-7-(2-chlorophenyl)-3,5-dihydro-1-methylpyrimido-(1,2-a)(1,4)benzodiazepin-3-one.

4,978,754

PREPARATION PROCESS OF UNSATURATED CARBOXYLIC ACID AMIDE

Akira Ibi; Masanori Kitagawa, both of Mobara; Eiichi Sagawa, Chiba; Koichi Takeuchi, Mobara, and Etsuo Ohkawado, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

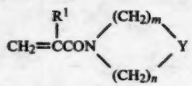
Filed Dec. 12, 1988, Ser. No. 282,687

Claims priority, application Japan, Dec. 17, 1987, 62-317450; Aug. 5, 1988, 63-194535

Int. Cl.[5] C07D *295/023*

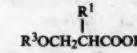
U.S. Cl. 544—176 **17 Claims**

1. A process for the preparation of an unsaturated carboxylic acid amide represented by the following formula (I):

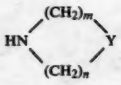


(I)

wherein R^1 means a hydrogen atom or methyl group, Y denotes an oxygen atom or methylimino group, m and n stand individually for an integer of 0 to 5, and m+n is an integer of 3 to 5, which comprises reacting a β-alkoxy-substituted carboxylate represented by the following formula (II):



wherein R^1 has the same meaning as defined above and R^2 and R^3 mean independently an alkyl group having 1 to 3 carbon atoms with a cyclic amine represented by the following formula (III):



(III)

wherein Y, m and n have the same meanings as defined above to form a β-alkoxy-substituted carboxylic acid amide compound and then removing an alcohol from the carboxylic acid amide compound in the liquid phase in the presence of a basic catalyst at a temperature of 50° to 170° C. under a pressure of 50 to 760 mm Hg to form an unsaturated group, wherein the basic catalyst is an alkali metal alcholate, alkalai metal hydroxide, alkaline earth hydroxide alkaline earth metal oxide or alkalai metal carbonate.

4,978,755

PERYLENETETRACARBOXYLIC ACID DIIMIDES HAVING LONG-CHAIN RADICALS CONTAINING CARBONYL GROUPS

Fridolin Bäbler, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

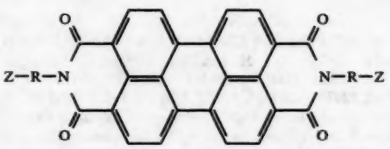
Continuation of Ser. No. 164,695, Mar. 7, 1988, abandoned. This application Jul. 24, 1989, Ser. No. 384,896

Claims priority, application Switzerland, Mar. 13, 1987, 954/87

Int. Cl.[5] C07D *221/18*

U.S. Cl. 546—37 **1 Claim**

1. A perylene-3,4,9,10-tetracarboxylic acid dimimide of the formula I



(I)

in which RZ is a —$(CH_2)_{11}$—$COOC_{12}H_{25}$ or —$(CH_2)_{11}$—$COOC_{18}H_{37}$ group.

4,978,756

COMPOUND AND USE

John R. Lawson, Middleton, England, assignor to ICI Americas Inc., Wilmington, Del.

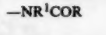
Filed Jan. 25, 1989, Ser. No. 301,785

Claims priority, application United Kingdom, Feb. 15, 1988, 8803477; Aug. 5, 1988, 8818708

Int. Cl.[5] C07D *277/72, 277/82*

U.S. Cl. 548—171 **13 Claims**

1. A compound which is a 2-mercaptobenzothiazole derivative having a group of the formula



bonded to the 2-mercaptobenzothiazole wherein:

R is a hydroxy group which is either a saturated hydrocarbyl group containing at least six but not more than 30 carbon atoms or an unsaturated hydrocarbyl group having a chain length of at least three but not more than 30 carbon atoms; and

R^1 is an hydrogen atom or an alkyl group containing not more than five carbon atoms.

13. The compound of claim 1 which is selected from 6(hexa-2,4-dienoylamino)-2-mercaptobenzothiazole; 6(octadeca-9,12-dienoylamino)-2-mercaptobenzothiazole; 6(octadeca-9-enoylamino)-2-mercaptobenzothiazole; and 6(undec-10-enoylamino)-2-mercaptobenzothiazole.

4,978,757

1,2,8,8A-TETRAHYDROCYCLOPROPA (C) PYRROLO [3,2-E)]-INDOL-4(5H)-ONES AND RELATED COMPOUNDS

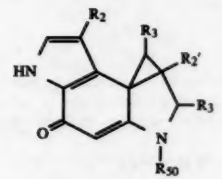
Robert C. Kelly, Ross Township; Martha A. Warpehoski, Comstock Township, and Wendell Wierenga, Oshtemo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 894,314, Aug. 7, 1987, Pat. No. 4,912,227, which is a continuation-in-part of Ser. No. 694,363, Jan. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 581,836, Feb. 21, 1984, abandoned. This application Nov. 30, 1989, Ser. No. 444,176

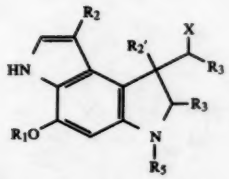
Int. Cl.[5] C07C *487/02*

U.S. Cl. 548—421 **4 Claims**

1. A compound selected from the group consisting of



I

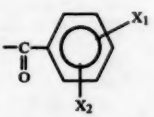


II

wherein R_1 is CH_3—, —CH_2Ph, CH_2—$CHCH_2$—, —CH_2SCH_3, —CH_2OCH_3, —$CH_2OCH_2CH_2OCH_3$, —CH_2CCl_3, —$CH_2CH_2Si(R_2)_3$, or H, where Ph is phenyl; R_2 is alkyl(C_1–C_5), phenyl, or H; R_2' is alkyl(C_1–C_5), phenyl, or H; R_2' is alkyl(C_1–C_5), phenyl, or H; R_3 is alkyl(C_1–C_5), phenyl, or H; X is Cl, Br, or I; or OSO_2R_{40} where R_{40} is alkyl(C_1–C_5), phenyl, tolyl, bromophenyl, nitrophenyl, or trifluoromethyl; R_{50} is hydrogen or the same as R_5; R_5 is a carbonyl acyl group selected from the group consisting of

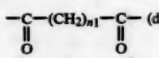
(i)

where R_6 is H, -alkyl(C_1–C_{20}), —CCl_3, CF_3, or NH_2;



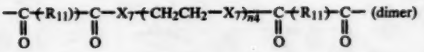
(ii)

where X_1 and/or X_2 is H, CH_3, OH, OCH_3, NO_2, NH_2, NNHAc, NHBz, or halogen;



(v)

wherein n_1=2–12;



(xvi)

where X_7=—O— or —NH—; R_{11}=—CH_2CH_2— or —CH=CH— and n_4=1–4.

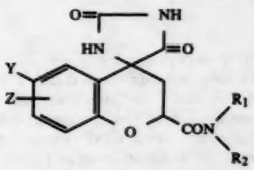
4,978,758

HYDANTOIN DERIVATIVES FOR TREATING COMPLICATIONS OF DIABETES

Masayasu Kurono, Mie; Yasuaki Kondo, Kasugai; Takaji Yamaguchi, Kuwana; Kenji Miura, Kasugai; Toshinao Usui, Gifu; Naofumi Terada, Nagoya; Kyoichi Asano, Nagoya; Kuniharu Mizuno, Aichi; Akira Matsubara, Owari-asahi; Noriaki Kato, Kasugai; Kiichi Sawai, Funabashi; Ryoichi Unno, Nagoya; Hiroshi Oxawa, Nagoya, and Masato Fukushima, Nagoya, all of Japan, assignors to Sanwa Kagaku Kenkyusho Co., Ltd., Aichi, Japan

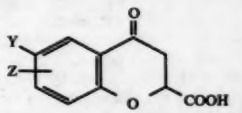
Division of Ser. No. 90,729, Aug. 28, 1987, Pat. No. 4,861,792.
This application May 23, 1989, Ser. No. 355,624
Claims priority, application Japan, Aug. 28, 1986, 61-199924; Nov. 14, 1986, 61-272612; Apr. 8, 1987, 62-84577
Int. Cl.[5] C07D *491/107*
U.S. Cl. 548—309 2 Claims

1. A process for the preparation of an optically active hydantoin derivative of the formula



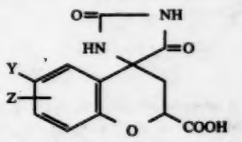
(I)

wherein Y and Z are the same or different, each being a hydrogen atom, a halogen atom or an alkyl group having 1 to 4 carbon atoms, R_1 and R_2 are the same or different, each being a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, which comprises reacting an optically active compound of the formula



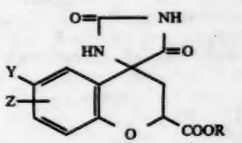
(II)

with an alkali metal cyanide and ammonium carbonate, reacting the resulting optically active compound of the formula



(III)

in the presence of an acid catalyst, with a compound of the formula ROH wherein R is an alkyl group having 1 to 4 carbon atoms, while azeotropically removing water as it is formed, and reacting the resulting optically active compound of the formula



(IV)

with a compound of the formula HNR_1R_2.

4,978,759

PROCESS FOR THE STEREOSPECIFIC SYNTHESIS OF OPTICALLY PURE 4-AMINO-3-HYDROXYCARBOXYLIC ACID DERIVATIVES

Patrick Jouin, Amiens; Dino Nisato, Saint Georges D'Orques, and Bertrand Castro, Saint Aunes, all of France, assignors to Sanofi, S.A. and Institut National de la Sante et de la Recherche Medicale, Paris, France

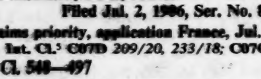
Filed Jul. 2, 1986, Ser. No. 881,191

Claims priority, application France, Jul. 3, 1985, 85 10181

Int. Cl.[5] C07D 209/20, 233/18; C07C 59/40, 51/00

U.S. Cl. 548—497 13 Claims

1. A process for the stereospecific preparation of optically pure (3R,4R)-4-amino-3-hydroxycarboxylic or (3S,4S)-4-amino-3-hydroxycarboxylic acid derivatives of the formula:



(I)

in which:

W is hydrogen or an N-protecting group;

R_1 represents a linear or branched alkyl radical having from 1 to 6 carbon atoms, a methoxy-lower alkyl radical, a benzyloxy-lower alkyl radical, a methylthio-lower alkyl radical, a phenylthio-lower alkyl radical, a benzylthio-lower alkyl radical, an amino-lower alkyl radical which is free or substituted by a protecting group on the amine group, a (lower alkyl)amino-lower alkyl radical, a (lower dialkyl)amino-lower alkyl radical, a hydroxy-lower alkyl radical, a free or esterified carboxy-lower alkyl radical, a free or alkylated carboxamido-lower alkyl radical, a lower alkyl radical substituted at the same time and on the same carbon atom by an amine and a free or esterified carboxyl, a linear or a branched alkenyl radical having from 2 to 6 carbon atoms, a methoxy-lower alkenyl radical such as methoxyvinyl, a phenoxy-lower alkenyl radical, a benzyloxyalkenyl radical, a methylthio-lower alkenyl radical, a phenylthio-lower alkenyl radical, a benzylthio-lower alkenyl radical, an amino-lower alkenyl radical which is free or protected on the amine group, a (lower alkyl-)amino-lower alkenyl radical, a (lower dialkyl)amino-lower alkenyl radical, a free or esterified carboxyalkenyl radical, a free or alkylated carboxamido-lower alkenyl radical or a linear or branched alkynyl radical having from 2 to 6 carbon atoms, or alternatively one of the radicals of the formulae:

Cy—A—, Cy—O—A'— or R_3S—A'—

in which:

Cy represents an aromatic or alicyclic hydrocarbon radical or a heterocyclic radical containing an oxygen or sulfur atom or one or two nitrogen atoms, Cy optionally being mono-, di- or tri-substituted by hydroxyl, lower alkyl, lower alkoxy, trifluoromethyl, nitro or halogeno radicals,

A represents a single bond or a linear or branched alkylene radical having from 1 to 5 carbon atoms or a linear or branched alkenylene radical having from 2 to 5 carbon atoms,

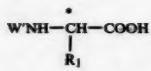
A' represents a linear or branched alkylene radical having from 1 to 5 carbon atoms, and

R_3 represents an S-protecting group; and

R_2 represents hydrogen, an alkali metal or alkaline earth metal, a lower alkyl or a benzyl which is unsubstituted or substituted by a lower alkyl group, a halogen or a nitro group,

which comprises

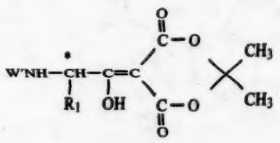
(a) reacting Meldrum's acid with a protected, optically pure amino acid, in the D or L configuration, of the formula:



(II)

in which W' represents an N-protecting group such as Boc or Z, and R_1 has the meaning indicated above, in a basic medium, in the presence of an activator for the amino acid (II) or of a coupling agent,

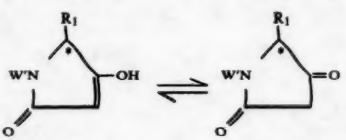
(b) then heating the resulting compound of the formula (III):



(III)

in which W' and R_1 are as defined above, in a solvent at a temperature of between 30° C. and 100° C.,

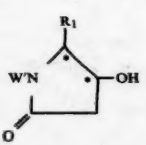
(c) then reducing the compound (IV–IVa) thus obtained in 2 tautomeric forms in equilibrium, in which the chirality of the carbon atom carrying the substituent R_1 is preserved, the said compound being represented by the following structures:



(IV) (IVa)

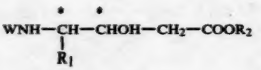
in which W' and R_1 are as defined above, with a metal borohydride in an acid medium, or by catalytic reduction under hydrogen pressure when R_1 is not sensitive to hydrogenation

(d) opening the ring of the resulting compound V of the formula:



(V)

in which W' and R_1 are as defined above, either in an acid medium in the case where W' represents an N-protecting group which is stable in an acid medium, or in a basic medium in the case where W' represents a sterically hindered N-protecting group which is labile in an acid medium, and, if necessary, finally deprotecting the nitrogen by removing the N-protecting group from the resulting compound of the formula:



by known methods.

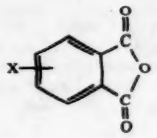
4,978,760

PREPARATION OF HALOGEN SUBSTITUTED PHTHALIC ANHYDRIDE

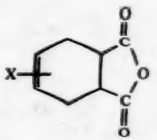
Ronald F. Spohn, Williamsville, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Feb. 24, 1988, Ser. No. 160,035
Int. Cl.[5] C07D 307/89
U.S. Cl. 549—246 14 Claims

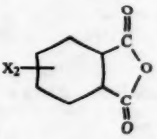
1. A process for the preparation of halogen substituted phthalic anhydride of the formula:



where X is a halogen, by reacting either a monohalogen substituted tetrahydrophthalic anhydride of the formula:



or a geminal dihalogen substituted hexahydrophthalic anhydride of the formula:



in vapor phase, admixed with air and with activated carbon as catalyst at a temperature of 200°–400° C.

4,978,761

5-HYDROXY-2-SUBSTITUTED-2,4,6,7-TETRAMETHYL-2,3-DIHYDROBENZOFURANS

Giichi Goto; Shigenori Ohkawa, both of Osaka, and Naohisa Fukuda, Kawanishi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 9, 1989, Ser. No. 363,729
Claims priority, application Japan, Jun. 10, 1988, 63-143859
Int. Cl.[5] C07D 307/79
U.S. Cl. 549—462 3 Claims

1. 5-Hydroxy-2-(phenyl-aliphatic)-2,4,6,7-tetramethyl-2,3-dihydrobenzofuran wherein said aliphatic is C_{2-6} alkylene or C_{2-6} alkenylene and said phenyl is unsubstituted or substituted by C_{1-3} alkyl, C_{1-3} alkoxy or halogen, or a pharmaceutically acceptable salt thereof.

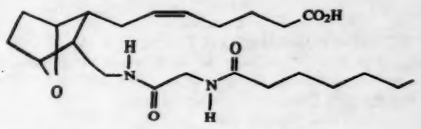
4,978,762

PROCESS FOR PREPARING [1S-[1α,2α(Z),3α,4α]]-7-[3-[[[[1-OXOHEPTYL]-AMINO]ACETYL]AMINO]METHYL]-7-OXABICYCLO-[2,2,1]HEPT-2-YL]-5-HEPTENOIC ACID

David Kronenthal, Yardley, Pa., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

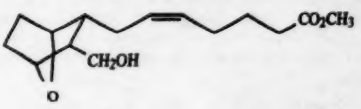
Filed Feb. 26, 1990, Ser. No. 484,307
Int. Cl.[5] C07D 307/00
U.S. Cl. 549—463 4 Claims

1. A process for preparing a compound of the formula

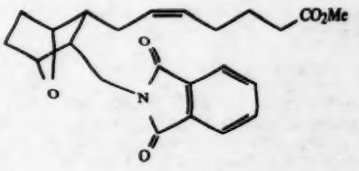


which comprises

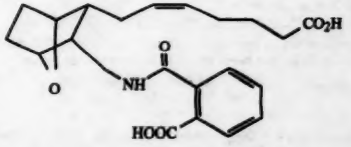
(A) reacting a compound of the formula



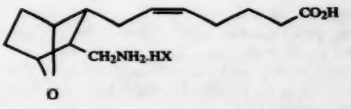
with phthalimide to form a compound of the formula



(B) Hydrolyzing the above phthalimide with a strong base to form a compound of the formula



(C) hydrolyzing the above phthalamic diacid with aqueous acid to form a compound of the formula



(D) acylating the above amino acid salt with [(1-oxoheptyl-)amino] acetic acid to form the desired compound.

4,978,763
NOVEL MANGANESE(II) DTPA CHELATE

Scott M. Rocklage, Saratoga; William P. Cacheris, Sunnyvale, and Gene Jamieson, Boulder Creek, all of Calif., assignors to Salutar, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 249,744, Sep. 27, 1988, Pat. No. 4,889,931. This application Jun. 23, 1989, Ser. No. 370,483
Int. Cl.[5] C07F 11/00
U.S. Cl. 556—50 7 Claims

1. A process for manufacturing a Mn(II) DTPA chelate comprising reacting substantially protonated, insoluble DTPA with MnO in water to form a substantially protonated Mn(II) chelate precipitate.

4,978,764
METHOD FOR AMMOXIDATION OF PARAFFINS

Michael J. Seely, Twinsburg; Maria S. Friedrich, Lyndhurst, and Dev D. Suresh, Hudson, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Sep. 25, 1989, Ser. No. 411,989
Int. Cl.[5] C07C 253/24
U.S. Cl. 558—319 19 Claims

1. A process for making an α, ε-unsaturated mononitrile by the catalytic reaction of a paraffin containing 3–5 carbon atoms with molecular oxygen and ammonia by catalytic contact of the foregoing reactants in a reaction zone with a catalyst composition that consists essentially of 10–90 weight percent of a diluent/support and 90–10 weight percent of a metal oxide catalyst containing the elements indicated by the empirical formula,

$$A_aD_dBi_cFe_fMo_{12}O_x$$

in the proportions indicated by the said formula, said diluent-/support containing 10 to 100 weight percent Al_2O_2 and zero to 90 weight percent SiO_2 wherein

A is one or more of Li, Na, K, Rb, Cs, Tl B, W , Sn and La;
D is one or more of Cr, Sb, Pb, P, Cu, Ni, Co, Mn and Mg;
a is zero to 10;
c is 0.1 to 10;
d is zero to 10; and
f is 0.2 to 10; and

wherein the reactants fed to the reaction zone contain a mole ratio of said paraffin:NH_3 in the range from 2 to 16 and a mole ratio of said paraffin to O_2 in the range from 1 to 10.

4,978,765
PROCESS FOR THE PRODUCTION OF ACRYLONITRILE

Yutaka Sasaki; Kunio Mori, and Kiyoshi Moriya, all of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd, Tokyo, Japan

Filed Apr. 14, 1989, Ser. No. 337,803
Claims priority, application Japan, Apr. 15, 1988, 63-91698
The portion of the term of this patent subsequent to Oct. 23, 2007, has been disclaimed.
Int. Cl.[5] C07C 253/26
U.S. Cl. 558—324 8 Claims

1. A process for the production of acrylonitrile by the vapor phase catalytic ammoxidation of propylene in a fluidized bed using a fluidized bed catalyst, wherein the fluidized bed catalyst has a catalytic composition satisfying the following empirical formula:

$$Q_qR_rMo_{10}Bi_aFe_bSb_cNi_dO_e(SiO_2)_f$$

wherein

Q represents P and/or B;
R represents at least one alkali metal element selected from the group consisting of Li, Na, K, Rb and Cs;
q, r, a, b, c, d, e and f each represent the atomic ratio of the element in the formula for which they are subscripts provided that
q is 0 to 3,
r is 0.01 to 1.5,
a is 0.1 to 3,
b is 0.1 to 2.5,
c is at least 2 and not larger than 15 (when the Sb material is Sb_2O_3), at least 2 and not larger than 30 (when the Sb material is Sb_2O_4) or at least 2 and not larger than 8 (when the Sb material is Sb_2O_5),
d is 4 to 8,
e is the number of oxygen atoms corresponding to the oxides formed by combining the above components together, and
f is 20 to 150; and wherein the fluidized bed catalyst is produced by

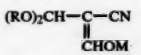
(i) preparing a slurry containing the above catalytic components, with control of the pH of said slurry to 5 or below;
(ii)spray-drying the slurry containing the catalytic components obtained to thereby form spherical particles, and
(iii) calcining the spherical particles.

4,978,766
PROCESS FOR PRODUCING 2-HYDROXYMETHYLENE-3,3-DIALKOXYPROPANENITRILE ALKALI METAL SALT AND PROCESS FOR OBTAINING ALCOHOLIC SLURRY OF SAID COMPOUND FROM ITS SYNTHETIC REACTION MIXTURE

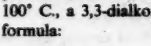
Keigo Nishihira; Shuzo Fujikawa, both of Ube, and Masayoshi Yamashita, Tokyo, all of Japan, assignors to UBE Industries, Ltd., Ube, Japan

Continuation-in-part of Ser. No. 150,016, Jan. 29, 1988, abandoned. This application Jan. 25, 1989, Ser. No. 302,059
Claims priority, application Japan, Feb. 17, 1987, 62-32381; Feb. 17, 1987, 62-32382
Int. Cl.[5] C07C 253/30, 253/34, 255/07
U.S. Cl. 558—353 9 Claims

1. A process for producing a 2-hydroxymethylene-3,3-dialkoxypropanenitrile alkali metal salt represented by the formula:



wherein R represents a lower alkyl group having 1 to 4 carbon atoms and M represents an alkali metal, which process consists of reacting at a temperature of 20° C. to 100° C., a 3,3-dialkoxypropanenitrile represented by the formula:



wherein R is the same as defined above, with carbon monoxide at a pressure of 20 to 100 kg/cm^2 (gauge), in a lower alcoholic solution of an alkali metal lower alkoxide, wherein the amount of the alkali metal lower alkoxide is 1.0 to 1.3 moles per one mole of 3,3-dialkoxypropanenitrile and the concentration of the alkali metal lower alkoxide in the lower alcoholic solution is 20 to 35% by weight; until the concentration of lower alcohol in the reaction mixture is 10% or less by weight.

4,978,767

DIPHENYLETHYLENE DERIVATIVE AND PHARMACEUTICAL USE

Youji Yamagishi, Kamiinayoshi; Kozo Akasaka; Takeshi Suzuki, both of Ushiku; Mitsuaki Miyamoto, Niihari; Kouji Nakamoto, Tsuchiura; Kazuo Okano, Yatabemachi; Shinya Abe; Hironori Ikuta, both of Ushiku; Kenji Hayashi; Hiroyuki Yoshimura, both of Yatabemachi; Tohru Fujimori, Toyosato; Koukichi Harada, Yatabemachi, and Isao Yamatsu, Ushiku, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

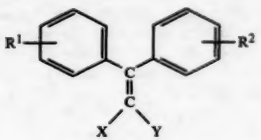
Division of Ser. No. 24,737, Mar. 11, 1987, Pat. No. 4,886,834. This application Jun. 9, 1989, Ser. No. 364,710

Claims priority, application Japan, Mar. 17, 1986, 61-57061; Mar. 26, 1986, 61-65963

Int. Cl.[5] C07C 255/04

U.S. Cl. 558—402 10 Claims

1. A diphenylethylene derivative having the formula



wherein

each of R^1 and R^2 is hydrogen, hydroxyl or lower alkoxy;

X is cyano; and

Y is

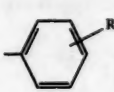
(1) $—R^{10}—COOR^3$, wherein

R^3 is hydrogen or lower alkyl and

R^{10} is alkylene having 1 to 3 carbon atoms and may have a branched alkyl or methoxyamino group,

(2) $—CONR^4R^5$, wherein each of R^4 and R^5 is hydrogen, alkyl, alkoxy, aryl, substituted aryl, aralkyl, substituted aralkyl, dialkylaminoalkyl or dimethoxyphenylalkyl,

(3) $—CH_2NHSO_2—R^{12}$ wherein R^{12} is methyl or



and R^8 is hydrogen, methyl or carboxy,

(4)

wherein

V is O or S,

R^7 is lower alkoxy, aryl, aralkyl, or hydrogen,

R^9 is alkyl, alkenyl or aryl,

(5)

wherein R^{11} is aryl or aralkyl, or pharmacologically acceptable salt thereof.

4,978,768

PROCESS FOR THE PREPARATION OF ALKYL ESTERS OF TETRACHLORO-2-CYANO-BENZOIC ACID

Jost von der Crone, Arconciel, Switzerland; Gonzague Overney, Glens Falls, N.Y., and Peter Dario, Choex, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

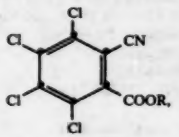
Filed Jan. 8, 1987, Ser. No. 1,311

Claims priority, application Switzerland, Jan. 15, 1986, 143/86

Int. Cl.[5] C07C 255/50

U.S. Cl. 558—416 10 Claims

1. A process for the preparation of a tetrachloro-2-cyanobenzoic acid alkyl ester of formula I

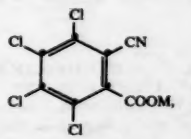


(I)

wherein R is C_1–C_5-alkyl, which process comprises

(a) reacting the ammonium salt of tetrachloro-2-cyanobenzoic acid, in the presence of water and an inert organic solvent, with a hydroxide of formula MOH, wherein M is Na or K, and removing the ammonia evolved, and

(b) reacting the resultant salt of formula II



(II)

obtained substantially in pure form in step (a), wherein M is as defined above, with 1 to 1.5 moles of a dialkyl sulfate of formula $SO_2(OR)_2$ or an alkyl halide of formula RHal, wherein R is as defined above and Hal is Cl, Br, I or F per mole of said resultant salt of formula II, also in the presence of water and an inert organic solvent.

4,978,769

PROCESS FOR INTRODUCING FLUORINE ATOMS INTO AROMATIC RINGS BY NUCLEOPHILIC EXCHANGE

Ernst Kysela, Bergisch Gladbach, and Rudolf Braden, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 7, 1989, Ser. No. 390,577

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827436

Int. Cl.[5] C07C 255/50, 57/72, 22/08, 25/13

U.S. Cl. 558—423 6 Claims

1. In the preparation of an aromatic ring-fluorinated compound by nucleophilic exchange between an educt and potassium fluoride in the presence of a phase transfer catalyst, the improvement wherein the educt is selected from the group consisting of 3,4-dichloro-nitrobenzene, 2,4-dichloro-nitrobenzene 2,4-dichloro- 5-fluoro-benzoyl chloride, 3,4-dichlorobenzoyl chloride, 2,6-dichloro-benzonitrile, 2-nitro-6-chlorobenzonitrile, 2-trifluoromethyl-4-nitrochlorobenzene, pentachlorobenzotrifluoride, 4-trifluoromethyl-tetrachlorobenzoyl chloride and 3,4,5-trichlorobenzotrifluoride, the phase transfer catalyst is a quaternary nitrogen compound, a quaternary phosphorus compound, a pyridinium salt or a crown ether, and the reaction is effected in the additional presence of a salt of a metal of main groups 3 to 5 of the periodic table of the elements and of sub-group elements, the reaction is effected at from about 100° to 250° C., about 0.1 to 10 moles of the metal

salt being present per mole of phase transfer catalyst, and about 0.1 to 20 mole % of the phase transfer catalyst being present based on the educt.

4,978,770

QUATERNARY AMMONIUM SALTS OF DICYANO SUBSTITUTED TERIARY ALKYLENE DIAMINES AS BLEACH ACTIVATORS

Muneo Aoyagi; Kazuhiro Takanashi; Masaaki Yamamura, all of Utsunomiya; Moriyasu Murata, Chiba; Hiroyuki Yamada, Tochigi; Hiroyuki Araki, Tochigi, and Takanori Fukumoto, Tochigi, all of Japan, assignors to Kao Corporation, Tokyo, Japan

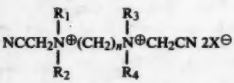
Division of Ser. No. 229,913, Aug. 8, 1988, Pat. No. 4,915,863. This application Mar. 30, 1990, Ser. No. 502,335

Claims priority, application Japan, Aug. 14, 1987, 62-202966; Sep. 9, 1987, 62-225870; Sep. 9, 1987, 62-225871; Mar. 24, 1988, 63-70380; Jul. 5, 1988, 63-167157

Int. Cl.[5] C07C *255/10, 255/04;* **C09K** *3/00;* **C01B** *15/055*

U.S. Cl. 558—455 **3 Claims**

1. A compound having the formula



in which each of R_1, R_2, R_3 and R_4 is alkyl having 1 to 6 carbon atoms, n is an integer of 1 to 16 and X is an anion.

4,978,771

PROCESS FOR THE SELECTIVE HYDROGENATION OF UNSATUATED COMPOUNDS

Paul Fiedler, Cologne; Hartmuth Buding, Dormagen, and Rudolf Braden, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 928,196, Nov. 7, 1986, abandoned. This application May 18, 1988, Ser. No. 195,513

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3540918

Int. Cl.[5] C07C *255/05, 255/09, 255/13, 255/22*

U.S. Cl. 558—459 **3 Claims**

1. A process for the hydrogenation of the C=C double bonds of a polymer consisting essentially of

(i) 85 to 50% by weight of copolymerized units of conjugated dienes selected from the group consisting of butadiene-1.3 and pentadiene-1.3,

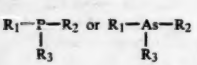
(ii) 15 to 50% by weight of copolymerized units of unsaturated nitriles selected from the group consisting of acrylonitrile and methacrylonitrile, and

(iii) 0 to 10% by weight of copolymerized units of other copolymerizable monomer in a homogeneous phase up to a hydrogenation degree of more than 80% with preservation of the nitrile units,

which process comprises reacting the polymer with hydrogen to a degree of hydrogenation greater than 80% at a pressure from 1 to 350 bar and a temperature from 80° to 200° C. in a ketone solvent having 3 to 10 carbon atoms in the presence of 10 to 1,000 ppm catalyst, based on polymer, which is a compound of the formula

$$RuH_{2n}L_{5-n}$$

wherein L is of the formula



wherein R_1, R_2 and R_3 are the same or different and each is alkyl having 1 to 20 carbon atoms, cycloalkyl having 5 to 7 carbon atoms, aryl having 6 to 18 carbon atoms or aralkyl having 1 to 6 alkyl carbon atoms, and n is the integer 1 or 2.

4,978,772

UTILIZATION OF OTILONIUM BROMIDE (DCI) FOR TOPICAL APPLICATION IN THE GASTROINSTESTINAL TRACT AND RELATED PHARMACEUTICAL FORMULATION APPROPRIATE FOR SUCH USE

Alessandro Casini, Florence; Sandro Parti, Valdarno, and Paolo Bucci, Montevarchi, all of Italy, assignors to A. Menarini S.A.S., Florence, Italy

Filed Nov. 4, 1987, Ser. No. 117,751

Claims priority, application Italy, Nov. 4, 1986, 9514 A/86

Int. Cl.[5] C07C *229/00*

U.S. Cl. 560—45 **19 Claims**

1. Method of using on a subject a pharmaceutical product based on otilonium bromide as active principle, which comprises the step of applying topically by an endoscopic instrument, at a selected location inside the gastrointestinal tract of the subject, a composition formed comprising said active principle, one or more antifoaming excipients and one or more emulsifying excipients.

4,978,773

PROCESS FOR THE PREPARATION OF 2,6-DICHLORODIPHENYLAMINOACETIC ACID DERIVATIVES

Ingomar Grafe, Nuremberg; Helmut Schickaneder, Eckental, and Kurt H. Ahrens, Nuremberg, all of Fed. Rep. of Germany, assignors to Heumann Pharma GmbH & Co., Nuremberg, Fed. Rep. of Germany

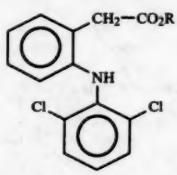
Filed Jun. 21, 1989, Ser. No. 369,618

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1989, 89101437

Int. Cl.[5] C07C *227/18*

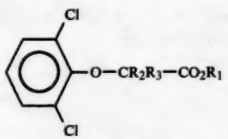
U.S. Cl. 560—47 **4 Claims**

1. Process for the preparation of 2,6-dichlorodiphenylamine derivatives corresponding to the general formula I



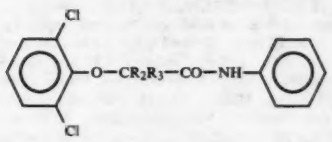
(I)

wherein R denotes a hydrogen atom, a C_1- to C_4-alkyl group or an alkali metal atom, characterised in that a 2,6-dichlorophenoxyacetic acid derivative corresponding to formula II

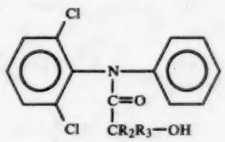


(II)

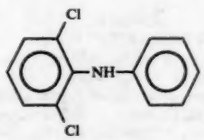
wherein R_1 denotes a hydrogen atom or a C_1 to C_6-alkyl group and R_2 and R_3 each denote a hydrogen atom or a C_1- to C_4-alkyl group is reacted with aniline in a one-shot process, first to form the compound corresponding to formula III


(III)

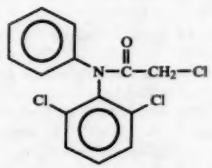
wherein R_2 and R_3 have the meanings indicated above, and then to rearrange the compound of formula III in situ to form the compound corresponding to formula IV


(IV)

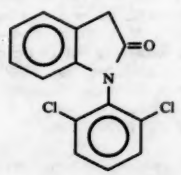
wherein R_2 and R_3 have the meanings indicated above, and the resulting compound corresponding to formula IV is aminolysed to the compound corresponding to formula V


(V)

and this compound corresponding to formula V is isolated and then converted into the compound corresponding to formula VI


(VI)

by a reaction with chloroacetyl chloride, and the compound corresponding to formula VI is cyclised to the compound corresponding to formula VII


(VII)

and the resulting compound of formula VII is converted into the compound corresponding to formula I by alkaline hydrolysis.

4,978,774

PROCESS FOR THE PREPARATION OF D(+)-2-(4-ACETYLPHENOXY)-PROPIONIC ESTERS

Günter Schlegel, Liederbach, and Hilmar Mildenberger, Kelkheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

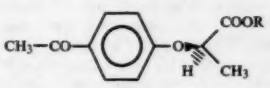
Filed Jan. 25, 1990, Ser. No. 470,101

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1989, 3902372

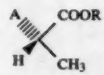
Int. Cl.[5] C07C *69/76*

U.S. Cl. 560—53 **13 Claims**

1. A process for the preparation of a D(+)-2-(4-acetylphenoxy)-propionic ester of the formula (I)


(I)

which comprises reacting 4-hydroxyacetophenone with L-lactic acid derivatives of the formula (II),


(II)

where, in the formulae (I) and (II)

R is a low-molecular alkyl radical and

A is halogen or a sulfonyloxy group, in a basic medium at temperatures of not more than 50° C.

4,978,775

PROCESS FOR PRODUCING BICYCLO[3.3.0]OCTANES

Shiro Ikegami; Yasuhiro Torizawa, and Seizi Kurozumi, all of Tokyo, Japan, assignors to Teijin Limited, Osaka, Japan

PCT No. PCT/JP85/00636, § 371 Date Jul. 16, 1986, § 102(e) Date Jul. 16, 1986, PCT Pub. No. WO86/02923, PCT Pub. Date May 22, 1986

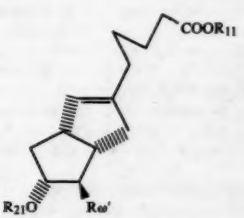
PCT Filed Nov. 14, 1985, Ser. No. 890,690

Claims priority, application Japan, Nov. 16, 1984, 59-240592

Int. Cl.[5] C07C *177/00*

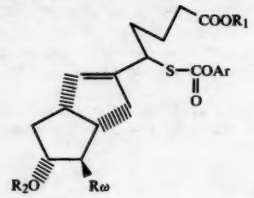
U.S. Cl. 560—119 **9 Claims**

1. A process for producing bicyclo[3.3.0] octanes expressed by the following formula (II)


(II)

wherein R_{11} indicates a hydrogen atom, $C_1 \sim C_{13}$ alkyl group, substituted or unsubstituted phenyl group, substituted or unsubstituted alicyclic group, substituted or unsubstituted phenyl ($C_1 \sim C_2$) alkyl group, tri ($C_1 \sim C_7$) hydrocarbon silyl group or one equivalent of cation; $R\omega$ indicates a substituted or unsubstituted $C_1 \sim C_{13}$ group or substituted or unsubstituted $C_2 \sim C_{13}$ alkenyl group; and R_{21} indicates a hydrogen atom or hydroxyl-protecting group;

which process comprises subjecting a thiol ester compound expressed by the following formula (I)



(I)

wherein R_1 indicates a $C_1 \sim C_{10}$ alkyl group, substituted or unsubstituted phenyl group, substituted or unsubstituted alicyclic group, substituted or unsubstituted phenyl ($C_1 \sim C_2$) alkyl group or tri ($C_1 \sim C_7$) hydrocarbon silyl group; Ar indicates a substituted or unsubstituted aryl group; Rω indicates a substituted or unsubstituted $C_1 \sim C_{13}$ group or a substituted or unsubstituted $C_2 \sim C_{13}$ alkenyl group; and R_2 indicates a hydroxyl-protecting group;

to a reduction reaction, followed by, if necessary, a deprotecting reaction, hydrolysis and/or salt-forming reaction.

4,978,776

PROCESS FOR THE MANUFACTURE OF METHYL METHACRYLATE FROM ISOBUTYRIC ACID

Samuel Yves, Saint Avold, and Daniel Cauvy, Boulay, both of France, assignors to Norsolor, Cedex, France

Continuation of Ser. No. 394,084, Aug. 15, 1989, abandoned. This application May 15, 1990, Ser. No. 524,669

Claims priority, application France, Aug. 16, 1988, 88 10911

Int. Cl.[5] C07C *67/30, 67/48*

U.S. Cl. 560—214 **13 Claims**

1. A process for the manufacture of methyl methacrylate from isobutyric acid, which process comprises:

subjecting isobutyric acid to a catalytic oxidative dehydrogenation in the vapor phase in an oxidative dehydrogenation stage to form a mixture of water, methacrylic acid and impurities including unconverted isobutyric acid;

condensing said mixture and carrying out a liquid-liquid extraction in an extraction stage to separate an aqueous phase containing the water, from an organic phase containing the acids obtained and impurities including acetone and methyl acetate;

esterifying said acids with methanol in an esterification stage to form a crude methyl methacrylate containing unesterified acids and containing methyl isobutyrate as an impurity, and using a fraction of the crude methyl methacrylate obtained as an extraction solvent in the extraction stage;

conveying the organic phase resulting from the extraction to a first separation stage which is located downstream of the esterification stage, and separating the organic phase to provide:

(1) crude methyl methacrylate consisting of the fraction of methyl methacrylate produced by esterification including the fraction thereof employed as an extraction solvent; and

(2) the organic acids consisting of the acids obtained at the end of oxidative dehydrogenation and the unesterified acids;

recycling said organic acids to the esterification stage; and

purifying the fraction of crude methyl methacrylate which was not employed as extraction solvent by separating pure methyl methacrylate and methyl isobutyrate in a second separation stage and recycling the methyl isobutyrate to the oxidative dehydrogenation stage.

4,978,777

NOVEL POLYMERIZABLE VINYL MONOMERS AND VINYL RESINS PREPARED THEREFROM

Ryozo Takagawa, 2-5-305, Kamishinden 3-chome, Toyonaka-shi, Osaka-fu; Hisaki Tanabe, B-40-508, 1, Ishishiro, Otokoyama, Yawata-shi, Kyoto-fu; Koji Asakura, 4-25-1, Kishibekita; Mitsuo Yamada, B-714, 45, Yamadaminami, both of Suita-shi, Osaka-fu; Hiroharu Ohsugi, 1-1-111, Nishimakino 4-chome, Hirakata-shi, Osaka-fu; Ryuzo Mizuguchi, 42-6-301 Hashimotokurigatani, Yawata-shi, Kyoto-fu, and Yoshio Eguchi, 10-2, Sumiyoshi 1-chome, Ikeda-shi, Osaka-fu, all of Japan

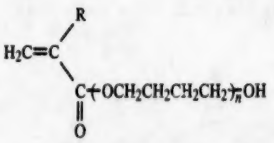
Filed Apr. 11, 1988, Ser. No. 180,072

Claims priority, application Japan, Apr. 10, 1987, 62-089316; Oct. 12, 1987, 62-256487

Int. Cl.[5] C07C *69/52*

U.S. Cl. 560—224 **3 Claims**

1. A polymerizable vinyl monomer represented by the formula:



wherein R represents a hydrogen atom or methyl group; and n is a real number of from 3 to 100.

4,978,778

PROCESS FOR PRODUCING VINYL ACETATE

Tomiya Isshiki, Tokyo; Yasuhiko Kijima, Chiba; Akiro Ito, Chiba; Yuh Miyauchi, Chiba; Takao Konko, Tokyo, and Takayuki Watanabe, Chiba, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Continuation of Ser. No. 301,409, Sep. 11, 1981, abandoned. This application Dec. 13, 1983, Ser. No. 560,279

Claims priority, application Japan, Sep. 16, 1980, 55-128404; Oct. 3, 1980, 55-138411

Int. Cl.[5] C07C *67/00, 69/15*

U.S. Cl. 560—261 **16 Claims**

1. A process for producing vinyl acetate which comprises reacting acetic anhydride with hydrogen gas in the presence of a catalyst consisting essentially of

(a) at least one material selected from the group consisting of metals belonging to Group VIII of the Periodic Table, compounds of the metals and mixtures thereof and

(b) at least one material selected from the group consisting of alkyl chlorides, alkyl bromides, alkyl iodides and mixtures thereof and materials convertible to an alkyl halide while removing vinyl acetate from the reaction system.

4,978,779

PREPARATION OF METHYLENE DIPHENYLENE DIISOCYANATES AND POLYMETHYLENE POLYPHENYLENE POLY (ISOCYANATES) USING AN ORGANIC SULFONIC ACID PROMOTER

Edward T. Shawl, Wallingford; Haven S. Kesling, Jr., Drexel Hill, and Frank J. Liotta, Jr., Collegeville, all of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

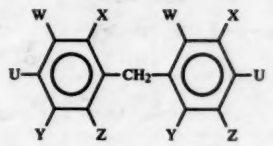
Filed Mar. 9, 1989, Ser. No. 321,496

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

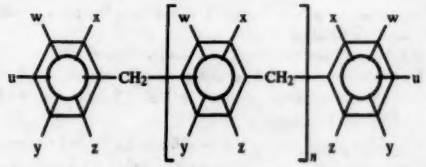
Int. Cl.[5] C07C *69/00*

U.S. Cl. 560—344 **18 Claims**

1. A process for the preparation of a methylene diphenylene diisocyanate or a polymethylene polyphenylene poly (isocyanate) which comprises heating at a temperature within the range of from about 50° C. to about 220° C. a methylene diphenylene bis (dialkylurea) having the formula



or a polymethylene polyphenylene poly (alkylurea) having the formula



wherein at least one of the substituents u, w, x, y and z on the ring is a dialkylureido (—NHCONRR′) group and the other substituents which may be the same or different on the ring, are hydrogen, an ether group or a nitro group, R and R′ of the dialkylureido group which may be the same or different are an alkyl group having independently from 1 to 8 carbon atoms and n is an integer of from 1 to 8, dissolved or slurried in an organic solvent or mixture of solvents, in the presence of an organic sulfonic acid or sulfonated aromatic ion exchange resin as a promoter to convert the urea to the corresponding isocyanate, and thereafter separating and recovering the diisocyanate or poly (isocyanate).

4,978,780

PREPARATION OF ETHER SULFONATES AND POLYGLYCOL ETHER SULFONATES, AND PRODUCTS PREPARED BY THIS METHOD

Rolf Fikentscher, Ludwigshafen; Norbert Greif, Bobenheim; Knut Oppenlaender, Ludwigshafen, and Karl Stork, Lampertheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 257,722, Oct. 14, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 405,582

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735056

Int. Cl.[5] C07C *303/02*

U.S. Cl. 562—42 **3 Claims**

1. A process for the preparation of ether sulfonates having the formula

$$R\text{-}O(C_nH_{2n}O)_z\text{-}CH_2CH_2\text{-}SO_3X$$

wherein R is H or an aliphatic or aromatic hydrocarbon group having 1 to 30 carbon atoms, n is from 2 to 30, z is from 0 to 300, and X is an alkali metal; comprising the steps:

(a) mixing one or more compounds selected from the group consisting of

$$R\text{-}O(C_nH_{2n}O)_z\text{-}H \text{ and } R\text{-}O(C_nH_{2n}O)_z\text{-}X$$

with a vinyl sulfonate salt in aqueous solution, wherein R, n, z and X are defined as given above;

(b) adding 0.2–2.0% by weight, based on the selected polyether, of a quaternary ammonium halide phase transfer catalyst;

(c) adding 0.1 to 3.0 by weight, based on the selected polyether, of an alkaline catalyst.

4,978,781

LOW-FOAM ALKALI-STABLE AMPHOTERIC SURFACE ACTIVE AGENTS

Richard J. Nadolsky, Plainsboro, N.J., assignor to Miranol, Inc., Dayton, N.J.

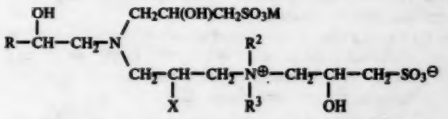
Division of Ser. No. 901,268, Aug. 27, 1986, Pat. No. 4,891,159. This application Sep. 25, 1989, Ser. No. 412,274

The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.

Int. Cl.[5] C07C *303/00*; C07D *279/12*

U.S. Cl. 562—102 **11 Claims**

1. Surface active compound of the formula:



wherein

R is selected from the group consisting of alkyl, aryl, alkylaryl groups of 4–18 carbons and alkoxymethylene wherein the alkoxy group is of 4–18 carbon atoms,

R^2 and R^3 are individually selected from the group consisting of methyl; alkyl of 5 to 6 carbon atoms wherein said alkyl group is substituted by an electron-donating group selected from the group consisting of OH, SH, CH_3O and CH_3S on the beta carbon atoms thereof; polyoxyethylene and polyoxypropylene or R^2 and R^3 may jointly form a $CH_2CH_2OCH_2CH_2$ or $CH_2CH_2SCH_2CH_2$ groups so as to form, together with the nitrogen atom to which they are bound, a morpholine or thiomorpholine ring, M is hydrogen or an alkali metal cation; X is hydrogen or an electron-donating group selected from the group consisting of OH, SH, CH_3O and CH_3S.

4,978,782

ORGANIC DISULFIDE COMPOUND USEFUL AS ANTIRADIATION AGENTS

Lamar Field, Nashville, Tenn.; Hikmat A. Musallam, Damascus, Md.; Jeffrey D. Macke, Ft. Mitchell, Ky., and Pramod K. Srivastava, Varanasi, India, assignors to Vanderbilt University, Nashville, Tenn.

Division of Ser. No. 228,010, Aug. 3, 1988, Pat. No. 4,883,890, which is a division of Ser. No. 907,882, Sep. 16, 1986, abandoned. This application Sep. 5, 1989, Ser. No. 402,755

Int. Cl.[5] C07C *145/00*

U.S. Cl. 562—125 **1 Claim**

1. Disodium !1,4-butylenedithio)bis(4-butanesulfinate).

4,978,783

2,6-DIMETHOXYHYDROQUINONE-3-MERCAPTOPROPIONIC ACID, 2,6-DIMETHOXYHYDROQUINONE-3-MERCAPTOACETIC ACID, AND ANTITUMOR USE THEREOF

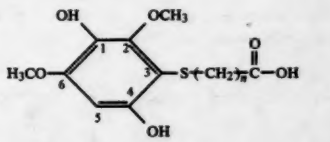
Leung Sheh, Taichung, Taiwan, assignor to National Science Council, Taipei, Taiwan

Filed May 2, 1990, Ser. No. 517,714

Int. Cl.[5] C07C *149/40, 321/00*

U.S. Cl. 562—431 **3 Claims**

1. A compound of the formula



wherein n is an integer of 1 or 2.

4,978,784

PROCESS FOR INDUSTRIAL MANUFACTURE OF SODIUM PARAHYDROXYMANDELATE

Yani Christidis, Paris, France, assignor to Societe Francaise Hoechst, Puteaux, France

Filed Oct. 25, 1989, Ser. No. 426,352
Claims priority, application France, Nov. 8, 1988, 88 14.575
Int. Cl.[5] C07C 59/48, 59/52
U.S. Cl. 562—470 8 Claims

1. Process for the industrial manufacture of sodium parahydroxymandelate, consisting essentially of

(1) reacting glyoxylic acid in aqueous solution with an excess of phenol in the presence of a tertiary amine, said tertiary amine being insoluble or slightly soluble in water and liquid at ambient temperature, and

(2) then salifying the parahydroxymandelic acid thus obtained with sodium hydroxide in aqueous solution.

4,978,785

OXIDATION OF POLYOXYPROPYLENE GLYCOLS TO ACIDS AND KETONES

John R. Sanderson, Leander, and John M. Larkin, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Dec. 11, 1989, Ser. No. 448,428
Int. Cl.[5] C07C 45/29, 49/175, 51/245, 53/126
U.S. Cl. 562—537 8 Claims

5. A method for the controlled nitric acid oxidation of a polyoxypropylene glycol in order to provide a reaction product containing a predominant amount of carboxylic acid derivatives of said polyoxypropylene glycol which comprises the steps of:

(a) preparing a first feedstock consisting essentially of an aqueous solution of nitric acid containing from about 5 to about 50 wt.% of nitric acid and from about 0.1 to about 1 parts by weight of an alkali metal nitrite per 100 parts by weight of said nitric acid,

(b) charging said feedstock to a reaction vessel,

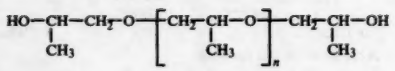
(c) establishing reaction conditions in said reaction vessel at about atmospheric pressure including a temperature of about 50° to about 100° C.,

(d) continuously adding a second feedstock consisting essentially of a polyoxypropylene glycol to said reaction vessel over a period of about 5 to about 15 hours with agitation while maintaining said reaction conditions to provide a reaction mixture comprising carboxylic acid derivatives of said polyoxypropylene glycol,

(e) withdrawing said reaction mixture from said reaction vessel, and

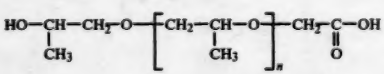
(f) recovering said carboxylic acid derivatives of said polyoxypropylene glycol from said reaction mixture,

(g) said polyoxypropylene glycol feedstock having the formula:



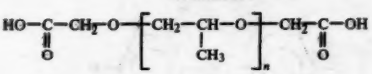
(I)

(h) said carboxylic acid derivatives of said polyoxypropylene glycol having the formulae:



(II)

-continued



(III)

wherein n is a positive number having an average value of about 2 to about 170.

7. A method for the controlled nitric acid oxidation of a polyoxypropylene glycol in order to provide a reaction product containing a significant amount of methyl ketone derivatives of said polyoxypropylene glycol which comprises the steps of:

(a) preparing a first feedstock consisting essentially of an aqueous solution of nitric acid,

(b) charging said feedstock to a reaction vessel,

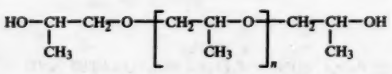
(c) establishing reaction conditions in said reaction vessel at about atmospheric pressure including a temperature of about 50° to about 100° C.,

(d) continuously adding a second feedstock to said reaction vessel over a period of about 5 to about 15 hours with agitation while maintaining said reaction conditions, said second feedstock consisting essentially of a polyoxypropylene glycol and from about 0.1 to about 1 parts by weight of an alkali metal nitrite per 100 parts by weight of said nitric acid, to thereby provide a reaction mixture comprising said methyl ketone derivatives of said polyoxypropylene glycol,

(e) withdrawing said reaction mixture from said reaction vessel, and

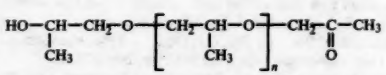
(f) recovering said methyl ketone derivatives of said polyoxypropylene glycol from said reaction mixture,

(g) said polyoxypropylene glycol feedstock having the formula:

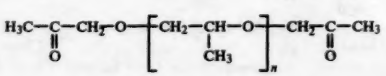


(I)

(h) said methyl ketone derivatives of said polyoxypropylene glycol having the formulae:



(IV)



(V)

wherein n is a positive number having an average value of about 2 to about 170.

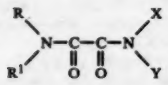
4,978,786

CHEMICAL PROCESS FOR THE PREPARATION OF OXAMIDE DERIVATIVES AND COMPOUNDS PREPARED THEREBY

Giuseppe Messina, Alghero; Giovanni Sechi, Ozieri; Loreno Lorenzoni, Porto Torres, and Vittorio Bruzzi, Milan, all of Italy, assignors to Enichem Anic S.p.A., Palermo, Italy

Continuation of Ser. No. 32,554, Apr. 1, 1987, abandoned. This application Apr. 5, 1990, Ser. No. 507,084
Claims priority, application Italy, Apr. 17, 1986, 20121 A/86
Int. Cl.[5] C07C 237/10, 237/08, 237/12, 255/29
U.S. Cl. 564—160 9 Claims

1. A process for preparing an oxamide derivative of formula I



I

wherein

R represents a substituted straight or branched (C_2–C_{12})alkyl radical wherein the substituent(s) or at least one of the substituents is selected from the group consisting of hydroxy, amino, mono-substituted amino, and di-substituted amino,

R^1 represents hydrogen or an optionally substituted (C_1–C_6)alkyl radical, and

X and Y are both hydrogen or X is the same as R and Y is the same as R^1,

which comprises reacting oxamide with a primary or secondary amine of formula RR^1NH wherein R and R^1 are as defined above, at a temperature of from 20° to 300° C., in the presence or in the absence of a solvent, and continuously removing ammonia which forms; said process being further characterized in that when in the starting amine reactant, R and/or R^1 contain an amino or mono-substituted amino substituent, the condensation product of formula I may react with additional oxamide or mono-substituted oxamide giving a di- and/or poly-condensation product thereof.

4,978,787

BENZOTRIAZOLES, AND THEIR PRODUCTION AND USE

Toru Haga, Takarazuka; Eiki Nagano, Nishinomiya; Ryo Sato, Toyonaka, and Kouichi Morita, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

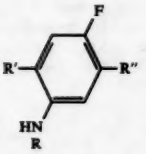
Division of Ser. No. 181,376, Apr. 14, 1988, Pat. No. 4,904,800, which is a division of Ser. No. 818,812, Jan. 14, 1986, Pat. No. 4,755,215. This application Sep. 11, 1989, Ser. No. 405,225

Claims priority, application Japan, Jan. 14, 1985, 60-4379

Int. Cl.[5] C07C *233/12, 211/51*

U.S. Cl. 564—218 **3 Claims**

1. A compound of the formula:



wherein R is a C_1–C_5 alkyl group, a C_3–C_5 alkenyl group, a C_3–C_5 alkynyl group, or a C_3–C_7 cycloalkyl group, R′ is a nitro group, and R″ is an amino or acetamido group.

4,978,788

COMPOSITION AND USE OF THE COMPOSITION FOR THE EXTRACTION OF METALS FROM AQUEOUS SOLUTION

Raymond F. Dalton, Cheadle Hulme, and John L. Leng, St. Albans, both of England, assignors to Imperial Chemical Industries PLC, London, United Kingdom

Continuation-in-part of Ser. No. 863,031, May 14, 1986, abandoned. This application Dec. 8, 1988, Ser. No. 281,078

Claims priority, application United Kingdom, May 16, 1985, 8512454; Jan. 15, 1986, 8600838

Int. Cl.[5] C07C *251/32*; C22B *15/00*; C01B *31/16*; C02F *1/42*

U.S. Cl. 564—265 **9 Claims**

1. A composition for use in extracting copper values from aqueous solutions of metal salts which comprises

(A) one or more o-hydroxyaryloximes containing at least 5 aliphatic or alicyclic carbon atoms which are strong metal extractants which, in 0.2 molar solution in an aliphatic hydrocarbon solution when loaded with 50% of the theroretical uptake of copper, will be in equilibrium with 0.1 molar solution of copper as copper perchlorate at a pH less than 1; and

(B) one or more branched chain aliphatic or aromatic-aliphatic alcohols containing 14 to 30 carbon atoms or aliphatic or aliphatic-aromatic esters containing 10 to 30 carbon atoms, wherein the ratio of the number of methyl carbon atoms to the number of non-methyl carbon atoms is higher than 1:5, and which is selected from the group consisting of highly branched isohexadecyl alcohol, highly branched isooctadecyl alcohol and a diester of 2,2,4,-trimethyl-1,3pentanediol; and

wherein the weight ratio of A to B is in the range 10:1 to 1:3.

4,978,789

PROCESS FOR PRODUCTION OF ALKENYL SUBSTITUTED AROMATIC COMPOUND

Katsuo Taniguchi, 68-3, Ushinoya-cho 3-chrome, Iwakuni-shi, Yamaguchi; Shigeki Fujikawa, 2-27, Seda 2-chrome, Waki-cho, Kuga-gun, Yamaguchi, and Yoshito Kurano, 2-30, Kawanishi 3-chrome, Iwakuni-shi, Yamaguch, all of Japan

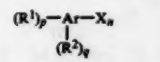
Continuation of Ser. No. 871,546, Jun. 6, 1986, abandoned. This application Jul. 10, 1989, Ser. No. 376,929

Claims priority, application Japan, Jun. 7, 1985, 60-122557; Jun. 21, 1985, 60-134293

Int. Cl.[5] C07C *209/68, 37/00*

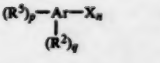
U.S. Cl. 564—305 **6 Claims**

1. A process for producing an alkenyl substituted aromatic compound having the general formula (I):



(I)

wherein Ar represents an aromatic ring, R, represents an alkenyl group having 2 to 8 carbon atoms, p is 1, 2, or 3 provided that R^1 may be the same or different when p is 2 or 3, R^2 represents an alkyl group having 1 to 8 carbon atoms or a cyclocalkyl group having 3 to 8 carbon atoms, q is 0, 1, or 2 provided that R^2 may be the same or different when q is 2, X represents —OH or $—NR^3R^4$ wherein R^3 and R^4 independently represent hydrogen or an alkyl group having 1 to 2 carbon atoms, n is 1 or 2, provided that the sum of p and q is 1, 2 or 3, comprising the step of catalytically dehydrogenating an alkyl substituted aromatic compound having the general formula (II):



(II)

wherein R^5 represents an alkyl group having 2 to 8 carbon atoms, and Ar, R^2, X, p, q, and n are the same as defined above, n is 1 or 2, provided that R^5 may be the same or different when p is 2 or 3 in the presence of a catalyst comprising (a) at least one iron oxide, as a main component, and (b) at least one silicon oxide.

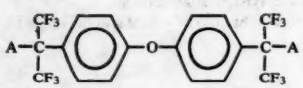
4,978,790

4,4'-BIS[2-(4-HYDROXY-AMINO-PHENYL)HEXAFLUOROISOPROPYL]-DIPHENYLETHERS AND THEIR USE

Jürgen Lau, and Günter Siegemund, both of Hofheim am Taunus, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

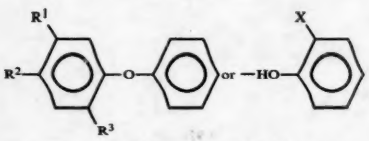
Filed Nov. 23, 1988, Ser. No. 276,194
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1987, 3739798; Nov. 24, 1987, 3739799
Int. Cl.[5] C07C 211/00
U.S. Cl. 564—315 6 Claims

1. A compound of the formula



(I)

in which A represents the radicals



in which R^1 and R^2 are different from one another and denote hydrogen, or $—NH_2$, R^3 is hydrogen or halogen, X represents $—NH_2$, with the proviso that R^1 is hydrogen, if R^2 is $—NH_2$ and R^2 is hydrogen, if R^1 is $—NH_2$.

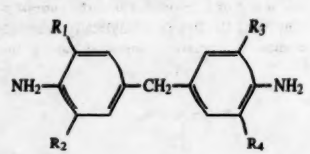
4,978,791

SUBSTITUTED P,P'-METHYLENE-BIS-ANILINE

Theodor Völker, Reinach, and Hans Althaus, Brig-Glis, both of Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

Filed Jun. 25, 1985, Ser. No. 748,594
Claims priority, application Switzerland, Jul. 6, 1984, 3281/84
Int. Cl.[5] C07C 211/56
U.S. Cl. 564—335 11 Claims

1. 2,2'-dichloro-6,6'-diethylmethylene-bis-aniline or a mixture thereof with at least one compound having the formula:



wherein R_1, R_2, R_3 and R_4 are the same or different and are straight-chained or branched alkyl having 2 to 4 C atoms, or R_1 and/or R_3 are chlorine and the remaining of R_1, R_2, R_3 and R_4 have the above-described definition, which is useful as chain-extension means or cross-linkage means for polyurethane of epoxide resins, respectively.

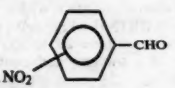
4,978,792

PROCESS FOR PRODUCING AMINOBENZYLAMINE

Teruyuki Nagata; Akihiro Tamaki; Katsuzi Watanabe, all of Fukuoka, and Akihiro Yamaguchi, Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Continuation of Ser. No. 241,968, Sep. 8, 1988, abandoned, which is a continuation-in-part of Ser. No. 129,916, Dec. 3, 1987, abandoned, which is a continuation of Ser. No. 668,705, Nov. 6, 1984, abandoned. This application Mar. 14, 1989, Ser. No. 323,087
Int. Cl.[5] C07C 211/00
U.S. Cl. 564—384 2 Claims

1. A process for producing m- or p-aminobenzylamine which comprises subjecting nitrobenzaldehyde expressed by a formula,



wherein nitro group is located at m-position or p-position, and ammonia to catalytic reduction in the presence of a reducing catalyst in an aliphatic lower alcohol, in said catalytic reduction nitrobenzaldehyde and liquid ammonia in an amount of 7 to 15 times by mol that of nitrobenzaldehyde are in advance made a mixed solution which is then introduced in divided manner, said catalytic reduction is carried out at a temperature in the range of 60° to 120° C.

4,978,793

NOVEL PROCESS FOR THE PREPARATION OF SERINOL

Jennifer M. Quirk, Highland; Stephen G. Harsy, Mt. Airy, both of Md., and Christer L. Hakansson, Helsingborg, Sweden, assignors to W. R. Grace & Co.-Conn., New York, N.Y.

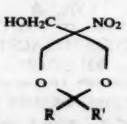
Filed Jun. 23, 1988, Ser. No. 210,945
Int. Cl.[5] C07C 209/00
U.S. Cl. 564—487 10 Claims

1. A process of forming 2-amino-1,3-propanediol which comprises

(a) reacting nitromethane with formaldehyde in a molar ratio of at least 3 moles of formaldehyde for each mole of nitromethane, said reaction conducted in the presence of a base to form tris(hydroxymethyl)-nitromethane(I);

(b) reacting (I) with a ketone of the formula

in the presence of an acid and under conditions to remove water by-product formed to produce a 5-nitro-5-hydroxymethyl-1,3-dioxane compound (II) of the formula



wherein each R and R' are independently from alkyl, cycloalkyl or aryl groups or R and R' together represent an alkylene group;

(c) reacting (II) with an alkali metal hydroxide at elevated temperature and neutralizing said alkali metal with an organic acid at a temperature of less than about 20° C. to produce 5-nitro-1,3-dioxane derivative (III) of the corresponding (II) reactant;

(d) reacting (III) under reducing conditions to produce the

5-amino-1,3-dioxane derivative (IV) of the corresponding (III) reactant; and

(e) hydrolyzing (IV) by contacting a solution of (IV) with an acid to produce 2-amino-1,3-propanediol.

4,978,794

NOVEL β-(2-ALKENYL)BIS(2-ISOCARANYL)BORANES

Herbert C. Brown, West Lafayette, Ind., assignor to Aldrich Chemical Company, Inc., Milwaukee, Wis.

Filed Mar. 26, 1990, Ser. No. 498,966
Int. Cl.[5] C07F 5/02
U.S. Cl. 568—1 12 Claims

1. B-(2-Alkenyl)bis(2-isocaranyl)boranes represented by the formula

wherein R is 2-alkenyl.

4,978,795

METHOD TO PREPARE TRIMETHYLSULFONIUM HALIDES

Peter E. Newallis, LeaWood, Kans.; Jeffrey D. Macke, Kansas City, Mo.; Karl G. Steinbeck, LeaWood, Kans., and Daniel N. Wasleski, Raytown, Mo., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1989, Ser. No. 321,600
Int. Cl.[5] C07C 319/20
U.S. Cl. 568—56 9 Claims

1. A process for the production of a trimethylsulfonium halide comprising reacting dimethyl sulfide and a methyl halide in the presence of a solvent which solvent is at least 60% water under pressure at a temperature of from about 45° to about 85° C.

4,978,796

N-ALKYLPYRROLIDONE SOLVENTS FOR PREPARATION OF AROMATIC THIOLS

James E. Shaw, Bartlesville, Okla., assignor to Phillips Petroleum Company, Barlesville, Okla.

Filed Jan. 31, 1990, Ser. No. 473,015
Int. Cl.[5] C07C 319/02
U.S. Cl. 568—68 11 Claims

1. A process for the preparation of aromatic thiols comprising contacting an aryl halide with an alkali metal alkanethiolate in the presence of N-alkylpyrrolidone and thereafter adding acid to form said thiol.

4,978,797

PROCESS FOR THE PREPARATION OF 2-HYDROXY-4-(HYDROXYALKOXY)-BENZOPHENONE

Bongsub Kim, Grosse Ile, Mich., and Hermann Kaack, Ruppertsberg, Fed. Rep. of Germany, assignors to BASF Corporation, Parsippany, N.J.

Filed Nov. 21, 1989, Ser. No. 439,722
Int. Cl.[5] C07C 45/71
U.S. Cl. 568—315 7 Claims

1. A process for the preparation of a 2-hydroxy4-(hydroxyalkoxy)-benzophenone, comprising reacting under an inert gas a 2,4-dihydroxybenzophenone with a C_2 to C_4 alkylene oxide in the presence of from about 0.1 weight percent to about 1.5 percent of a basic catalyst, and at least 0.1 weight percent water, at temperatures between about 100° C. to about 145° C, wherein the weight percentages are based on the weight of the 2,4-dihydroxybenzophenone.

4,978,798

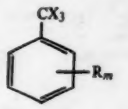
METHOD OF MAKING HALOBENZOPHENONES AND INTERMEDIATES THEREOF

Jeffrey S. Stults, Grand Island, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

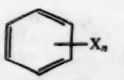
Filed Nov. 13, 1989, Ser. No. 434,742
Int. Cl.[5] C07C 45/65
U.S. Cl. 568—316 22 Claims

1. A method of making a fluorinated benzophenone comprising

(1) reacting a trihalomethyl benzene having the general formula

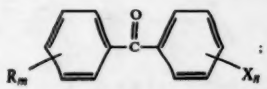


with a halobenzene having the general formula



and a Lewis acid having the general formula MX_p, to form a bisphenyl dihalomethane, where each R is independently selected from hydrogen, alkyl, or X, each X is independently selected from halogen, M is aluminum, boron, antimony, or molybdenum, "m" is 1 to 5, "n" is 2 to 5, "p" is the valence of M, and at least two of X's in said halobenzene are chlorine;

(2) reacting said bisphenyl dihalomethane with water to form a halobenzophenone having the general formula



(3) reacting said halobenzophenone with a fluorinating agent whereby at least one chlorine, but not all chlorines, is replaced with a flurorine; and

(4) removing all remaining chlorines.

4,978,799

PRODUCTION OF DETERGENT RANGE ALCOHOLS AND KETONES USING PORPHYRIN CATALYSTS

John R. Sanderson, Leander; Edward T. Marquis, and Howard F. Payton, both of Austin, all of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Oct. 30, 1989, Ser. No. 428,812
Int. Cl.[5] C07C 45/28
U.S. Cl. 568—385 11 Claims

1. A process for the production of a mixture of detergent range alcohols and ketones having from about 10 to 18 carbon atoms comprising reacting an alkane having from about 10 to 18 carbon atoms with a hydroperoxide at a temperature in the range of from about 10° to 180° C. in the presence of a transition metal porphyrin catalyst selected from the group consisting of ferrous phthalocyanine, chloroferric phthalocyanine, iron (II) meso-tetraphenyl porphine chloride, manganese (II) tetraphenyl porphine acetate, cobalt (II) meso-tetraphenyl porphine, and mixtures thereof.

4,978,800

PRODUCTION OF DETERGENT RANGE ALCOHOLS AND KETONES USING ACETYLACETONATE CATALYSTS

John R. Sanderson, Leander; Edward T. Marquis, and John F. Knifton, both of Austin, all of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Oct. 30, 1989, Ser. No. 428,703
Int. Cl.[5] C07C 45/28
U.S. Cl. 568—385 4 Claims

1. A process for the production of a mixture of detergent range alcohols and ketones having from about 10 to 18 carbon atoms comprising reacting an alkane having from about 10 to 18 carbon atoms with a hydroperoxide in the presence of a transition metal acetylacetonate catalyst where the catalyst is selected from the group consisting of (1) ruthenium acetylacetonate alone, (2) ruthenium acetylacetonate and iron acetylacetonate as a co-catalyst, (3) ruthenium acetylacetonate and chromium acetylacetonate as a co-catalyst, (4) iron acetylacetonate and copper acetate as a co-catalyst and mixtures thereof.

4,978,801

PREPARATION OF AROMATIC ALDEHYDES

Norbert Bluthe, Villeurbanne, and Robert Perron, Charly, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Apr. 28, 1987, Ser. No. 43,423
Claims priority, application France, Apr. 28, 1986, 86 06364
Int. Cl.[5] C07C 45/49
U.S. Cl. 568—428 19 Claims

1. A process for the preparation of an aromatic aldehyde, comprising reacting carbon monoxide/hydrogen admixture with an aromatic halide in the presence of a noble metal-based catalyst and a tertiary nitrogenous base, and wherein the CO/H_2 ratio is less than 1.

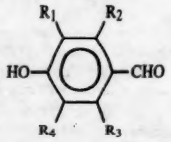
4,978,802

PROCESS FOR PRODUCTION OF AROMATIC ALDEHYDES

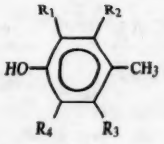
Philippe Campo, Montigny-Le-Bretonneux; Panayotis Cocolios, Limours; Paul Dognin, Paris, and Henry Ledon, Versailles, all of France, assignors to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris, France

Filed Dec. 20, 1988, Ser. No. 286,788
Claims priority, application France, Dec. 24, 1987, 87 18133
Int. Cl.[5] C07C 45/29, 45/38
U.S. Cl. 568—432 10 Claims

1. A process for the production of aromatic aldehydes having the formula



in which each of R_1, R_2, R_3 and R_4 selected from the group consisting of hydrogen, a lower alkyl radical and halogen, by reacting an alkylphenol of the formula



In which R_1, R_2, R_3 and R_4 have the same meaning as above, with oxygen, in a solvent medium in the presence of a base and a catalytic amount of a cobalt compound, wherein the oxidation reaction of the substrate is performed in the presence of a catalyst consisting of a chelated complex of cobalt(II) selected from the group consisting of bis-(4-methylpyridine isoindolinato)cobalt (II) acetate, phthalocyaninatocobalt(II) and sulfophthalocyaninanatocobalt(II).

4,978,803

VAPOR PHASE OXIDATION PROCESS FOR MAKING GLYOXAL

Roger J. Card, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Jun. 26, 1989, Ser. No. 373,843
Int. Cl.[5] C07C 45/38, 45/39
U.S. Cl. 568—486 8 Claims

1. In the process for oxidation of ethylene glycol to produce glyoxal wherein a vapor phase mixture comprising oxygen, ethylene glycol and inert diluent gas is contacted with a solid catalyst consisting essentially of 0 to 25% by weight silver, up to 20% by weight of phosphorus and the remainder being copper at reaction temperature in the range from 180° C. to 600° C., the improvement wherein said vapor phase mixture further comprises from 0.5 to 25 ppm of an additive selective from iodine and organic compounds of iodine soluble in ethylene glycol and readily vaporized at temperature below 400° C. and reactive with copper under the reaction conditions to form iodide of copper.

4,978,804

PROCESSES FOR THE CONVERSION OF MYRCENE TO CITRAL

James B. Woell, Lawrenceville, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 269,278, Nov. 9, 1988. This application Jun. 9, 1989, Ser. No. 363,808
Int. Cl.[5] C07C 45/00
U.S. Cl. 568—489 24 Claims

1. A process for producing citral comprising contacting myrcene with palladium (II) chloride in the presence of an inert aqueous alkylamide solvent and a metal oxoanionic salt at a temperature of at least about 80° C.

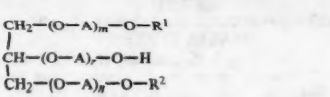
4,978,805

POLYETHERS

Richard Baur, Mutterstadt; Stefan Birnbach, Ludwigshafen; Alfred Oftring, Bad Duerkheim, and Ekhard Winkler, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

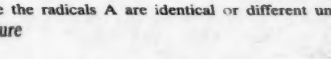
Filed Jun. 9, 1989, Ser. No. 363,870
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1988, 3820000
Int. Cl.[5] C07C 43/11
U.S. Cl. 568—622 4 Claims

1. A polyether of the formula I



I

where the radicals A are identical or different units of the structure



R^1 and R^2 are each C_9-C_{20}-alkyl, n and m are each from 1 to 30 and l is from 0 to 20.

4,978,806

SCALE-UP AND SYNTHESIS OF 1-METHOXYCYGLOHEPTA-1,3,5-TRIENE

Gordon E. Langford, Edmonton, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Canada

Filed Nov. 27, 1989, Ser. No. 441,511
Claims priority, application Canada, Jan. 24, 1989, 589473
Int. Cl.[5] C07C 41/00, 43/18
U.S. Cl. 568—667 8 Claims

1. A method for preparation of 1-methoxycyclohepta-1,3,5-triene which comprises the steps of heating 7,7-dichloro-1-methoxybicyclo[4.1.0]heptane in a refluxing reaction solvent comprising a lower boiling aromatic amine, at reflux, until suitable amounts of 1-methoxycyclohepta-1,3,5-triene have been produced, and recovering the 1-methoxycyclohepta-1,3,5-triene.

4,978,807

METHOD FOR THE PREPARATION OF METHYL TERTIARY BUTYL ETHER

Lawrence A. Smith, Jr., Bellaire, Tex., assignor to Chemical Research & Licensing Company, Houston, Tex.

Division of Ser. No. 328,487, Mar. 23, 1989. This application Jun. 29, 1989, Ser. No. 373,232
Int. Cl.[5] C07C 41/06
U.S. Cl. 568—697 11 Claims

1. A method of preparing methyl tertiary butyl ether comprising:

(a) feeding (1) a mixture containing isobutene and normal butene and (2) methanol to a distillation column reactor into a feed zone, said distillation reactor column having an upper reaction distillation zone filled with a fixed bed cation exchange resin packing and a lower distillation zone.

(b) concurrently in said distillation column reactor:

(1) contacting said mixture and said methanol with said fixed bed acid cation exchange resin packing in said reaction distillation zone thereby catalytically reacting the isobutene with methanol to form methyl tertiary butyl ether and

(2) fractionating the resulting mixture of ether and unreacted methanol, isobutene and normal butene in both said zones, vapor passing from said lower distillation zone into said upper reaction distillation zone and contacting said cation exchange resin packing therein while maintaining a froth level in said fixed bed acid cation exchange resin packing within said upper reaction distillation zone, said froth level being characterized as an increased density of the material in the reaction distillation zone compared to a distillation carried out in the absence of said froth level,

(c) withdrawing the ether from the distillation column reactor as bottoms and

(d) withdrawing the unreacted methanol, isobutene and normal butene from the upper reaction distillation zone of the distillation column reactor as overheads.

4,978,808

METHOD OF PRODUCING 2,2-BIS(3-NITRO-4-HYDROXYPHENYL)HEXAFLUORO-PROPANE

Masamichi Maruta, Kawagoe, and Tetsuo Wada, Ube, both of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed May 31, 1989, Ser. No. 359,229
Claims priority, application Japan, May 31, 1988, 63-131456
Int. Cl.[5] C07C 79/32
U.S. Cl. 568—707 10 Claims

1. A method of producing 2,2-bis(3-nitro-4-hydroxyphenyl)-hexafluoropropane, comprising the step of:

reacting 2,2 bis(4-hydroxyphenyl)hexafluoropropane with nitric acid in a lower fatty acid at a temperature within a range from about 30° C. to about 70° C.

4,978,809

META-HALOGENATED DIBENZYLPHENOLS

Abel Mendoza, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 13, 1989, Ser. No. 434,150
Int. Cl.[5] C07C 39/12
U.S. Cl. 568—720 12 Claims

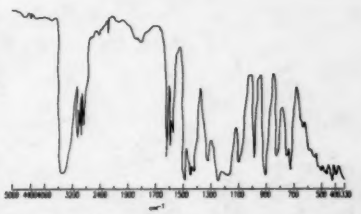
1. A thermally stable methylene-bridged polyphenol having (1) at least two phenolic hydroxyl moieties which are substituted on different aromatic rings wherein at least one phenolic hydroxyl is in a ring position ortho to a methylene bridge, and (2) at least two halogens, each of which is substituted on an aromatic ring in a position meta to a phenolic hydroxyl.

4,978,810

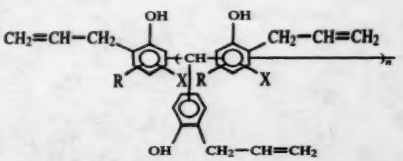
POLYALKENYLPHENOL COMPOUND

Kaoru Kanayama, and Shuji Ichikawa, both of Ibaraki, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Sep. 18, 1989, Ser. No. 408,387
Claims priority, application Japan, Sep. 28, 1988, 63-242959
Int. Cl.[5] C07C 39/367, 39/373, 39/40
U.S. Cl. 568—720 1 Claim

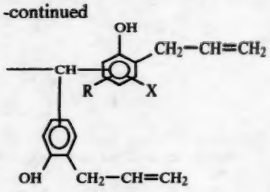


1. A polyalkenylphenol compound represented by formula (I):



(I)

-continued



wherein R represents a hydrogen atom or a methyl group; X represents a hydrogen atom or a halogen atom; and n represents 0 or an integer of from 1 to 10.

4,978,811

PROCESS FOR HYDROLYSIS OF ORTHO-AROMATIC DI-ARYL ETHERS

Robert A. Koster; Philip J. Brondsema; Willis J. Pennington; William C. Sumner, all of Midland, Mich., and Susan E. Vilmer, Grapevine, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 1, 1988, Ser. No. 176,533
Int. Cl.[5] C07C 37/50, 39/00
U.S. Cl. 568—734 21 Claims

1. A process for preparing ortho-aromatic phenolic compounds comprising contacting a diaryl ether, which contains at least one aromatic substituent ortho to the ether oxygen, with water in the presence of a catalytic amount of catalyst comprising ceria, thoria or a combination thereof at a temperature and pressure sufficient to form phenolic compounds.

4,978,812
ELECTROMAGNETIC WAVE SHIELDING TRANSPARENT BODY

Kazuyuki Akeyoshi, Yamato; Takeshi Matsumoto, Yokohama; Satoru Harada, Yokohama; Masatake Nakamura, Tokyo, and Toshiyuki Ishikawa, Ichikawa, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,278

Claims priority, application Japan, Dec. 25, 1987, 62-327397; Dec. 25, 1987, 62-327398; Dec. 25, 1987, 62-333514; Dec. 25, 1987, 62-333515; Dec. 25, 1987, 62-333516

Int. Cl.[5] H05K 9/00

U.S. Cl. 174—35 M S 10 Claims

1. An electromagnetic wave shielding transparent body comprising one or more transparent sheets, a transparent conductive layer formed as a first electric conductor on at least one of said transparent sheets, and a second electric conductor separated from said transparent conductive layer wherein the second electric conductor has an electromagnetic shielding property complementary to the electromagnetic shielding property of the first electric conductor; and further wherein the second electric conductor is in the form of a lattice pattern; and wherein said lattice is formed in a polygonal pattern in which the length of the longer diagonal line of each lattice unit is greater than or equal to 1 cm.

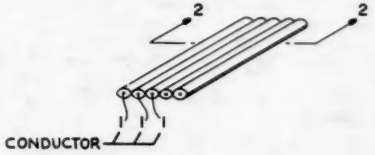
4,978,813
ELECTRICAL CABLE

Donald L. Clayton, Phoenix, and Dinesh Shah, Chandler, both of Ariz., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Aug. 29, 1989, Ser. No. 400,247

Int. Cl.[5] H01B 7/08

U.S. Cl. 174—117 F 5 Claims



1. An electrical cable comprising:
(a) at least one conductive wire,
(b) an insulating layer surrounding the conductive wire, said insulating layer comprising expanded, microporous sintered polytetrafluoroethylene,
(c) a primer coating of a polyesterpolyurethane surrounding the insulating layer,
(d) an outer coating covering and surrounding the primer coating comprising a film of thermoplastic polyester elastomer.

4. An electrical cable comprising a series of side-by side parallel conductive wires arranged in a coplaner configuration to form a flat construction; said wires covered and surrounded by an insulative layer of expanded, microporous polytetrafluoroethylene; said insulative layer covered by a covering of a polyesterpolyurethane; said cable having an outer layer of thermoplastic polyester elastomer coating which forms a solid protective film coating surrounding the assembly within.

4,978,814
ELECTRICAL DEVICE INCLUDING AN ELECTRICAL CONNECTOR

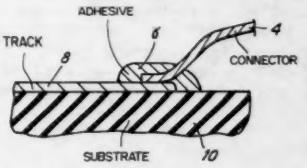
Andrew M. Honour, Amersham, England, assignor to Thorn EMI plc, London, England

Filed Feb. 13, 1989, Ser. No. 308,930

Claims priority, application United Kingdom, Feb. 16, 1988, 8803519

Int. Cl.[5] H01R 4/04

U.S. Cl. 174—130 R 6 Claims



1. An electrical device comprising an electrically insulative substrate; a thick film heater track applied to the substrate, the thick film heater track comprising a metal and a glass material in composition; a connection wire for providing an electrical connection to the thick film heater track; and an electrically conductive adhesive bond for mechanically and electrically connecting the connection wire to the thick film heater track, the adhesive bond comprising a metal and a glass material in composition; wherein the connection wire comprises a multiplicity of conductive fibres having a diameter in the range of from 10 μm to 300 μm and arranged to form the connection wire, the connection wire having a deformed end portion to expose the multiplicity of conductive fibres, the end portion of exposed conductive fibres being embedded in the electrically conductive adhesive bond on said thick film heater track so as to provide a mechanical and electrical connection between the connection wire and the thick film heater track.

4,978,815
LOAD SELECTOR FOR STEP TRANSFORMERS

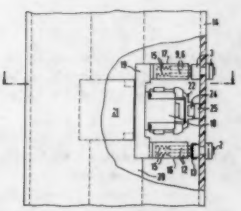
Siegbert Berger, Bretten; Karl Kurz, Stuttgart, and Alfred Mayer, Lorch, all of Fed. Rep. of Germany, assignors to Maschinenfabrik Reinhausen GmbH, Regensburg, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 415,060

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1988, 3833126

Int. Cl.[5] H01H 19/54, 33/66

U.S. Cl. 200—11 TC 14 Claims



1. Load selector for switching over from one tap of a step transformer to the next, comprising:

a switch shaft, a pivotable contact carrier on said switch shaft,

an insulator disposed along a circle, fixed step contacts disposed on said insulator along said circle and connected to taps of a step transformer;

at least two switch contacts per phase being disposed in common on said contact carrier and simultaneously pivotable on said circle;

two vacuum switches per phase electrically built into said contact carrier and connected in series with said switch contacts;

a cam race disposed on said insulator along said circle, rollers being supported by said contact carrier and running along said cam race for actuating said vacuum switches;

a slip ring being supported on said insulator and being coaxial with said cam race and said circle, said cam race being disposed axially between and spaced apart from said fixed step contacts and said slip ring; and

slip contacts being supported by said contact carrier for sliding on said slip ring, each of said vacuum switches being electrically connected between a respective one of said switch contacts and a respective one of said slip contacts.

4,978,816

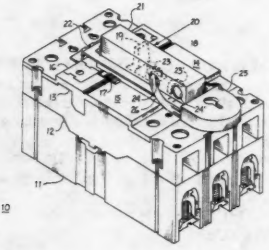
CIRCUIT BREAKER HANDLE INTERLOCK ARRANGEMENT

Roger N. Castonguay, Terryville, and Robert A. Morris, Burlington, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Feb. 16, 1990, Ser. No. 481,012

Int. Cl.[5] H01H *9/28*

U.S. Cl. 200—43.14 **16 Claims**



1. A circuit breaker operating handle interlock arrangement comprising:

a support base adapted to be attached to a top surface of a molded case circuit breaker proximate a circuit breaker operating handle having ON and OFF positions on said top surface;

a circuit breaker operating handle enclosure consisting of a top having a pair of depending sides arranged for preventing access to said operating handle, said handle enclosure being pivotally attached to said support base; and

a locking hasp upstanding from said support base and aligned with a pair of opposing apertures, one through each of said sides, said apertures being arranged on an end of said handle enclosure proximate said ON position.

4,978,817

INTERLOCK SWITCH FOR A COPYING APPARATUS

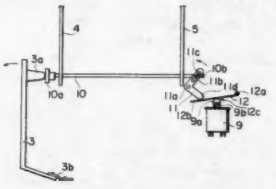
Hiroyuki Honda, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Aug. 3, 1989, Ser. No. 388,846

Claims priority, application Japan, Aug. 12, 1988, 63-201667

Int. Cl.[5] H01H *9/20*; G03G *15/04*

U.S. Cl. 200—50 A **5 Claims**



1. An interlock switching apparatus for switching a copying apparatus power supply on and off, the copying apparatus including a front and a rear panel and a front and a rear frame, wherein the front panel is capable of being selectively moved between an opened position and a closed position, the switching apparatus comprising:

switch means disposed in proximity to the rear panel for switching the copying apparatus on and off;

interlock means movably disposed in the front and rear frames for identifying the opened and closed positions of the front panel to the switch means, the interlock means including first and second opposed ends;

a rotatable member rotatably disposed on the first opposed end of the interlock means; and

actuating means in communication with the rotatable member for moving the interlock means towards the rear panel when the front panel is closed, rotating the rotatable member to press the actuating means and activating the switch means, and returning the interlock means towards the front panel, rotating the rotatable member in an opposite direction, releasing the actuating means by the rotatable member and deactivating the switch means when the front panel is opened.

4,978,818

KEY FOR A CIRCUIT BOARD

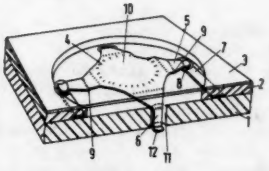
Peter Rothlin, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Apr. 6, 1990, Ser. No. 505,846

Claims priority, application Switzerland, Apr. 10, 1989, 1344/89

Int. Cl.[5] H01H *5/18*

U.S. Cl. 200—406 **14 Claims**



4. In combination,

a circuit board having at least two electrical conductors thereon;

a spacer layer disposed on said board and having a recess therein; and

an electrically conductive snap disc disposed within said recess, said disc including a centrally disposed bulge, a

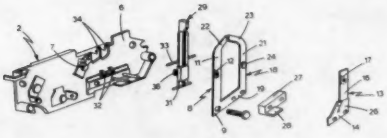
pair of contact tabs extending outwardly of said bulge and disposed in contact with said conductors, a pair of tension tabs extending outwardly of said bulge and secured to said circuit board to bias said contact tabs into contact with said conductors, each said contact tab having an intermediately disposed bent portion between a respective conductor and said bulge for engagement with said circuit board in response to depressing of said bulge towards said circuit board to effect a lifting of said respective contact tab from a respective electrical conductor.

4,978,819

ELECTRIC MACHINERY SWITCH ASSEMBLY

William D. Crow, Maryland Heights, and Ronald D. Williams, St. Charles, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Jul. 24, 1989, Ser. No. 383,425
Int. Cl.[5] H01H *35/10*
U.S. Cl. 200—80 R **13 Claims**



1. A switch assembly including a terminal board for connecting a power source to said switch assembly, comprising:

first electrical contact means mounted to said terminal board;

first conductive means mounted to said terminal board including a base portion and a first flexible conductive body portion extending outwardly from said base portion in cantilevered fashion, said first flexible conductive body portion including a second electrical contact means cooperatively positioned in spaced opposed relation to said first electrical contact means, said opposed first and second electrical contact means providing a first electrical contact pair;

second conductive means mounted to said board in insulated fashion from said first conductive means and including a second base portion and a second flexible conductive body portion extending outwardly from said second base portion in cantilevered fashion, said second flexible conductive body portion of said second conductive means including a third electrical contact means positioned in spaced insulated relation from said first electrical contact means;

third conductive means mounted to said board and including a third base portion and a third flexible conductive body portion extending outwardly from said third base portion in cantilevered fashion, said third flexible conductive body portion of said third conductive means including a fourth electrical contact means cooperatively positioned in spaced opposed relation to said third electrical contact means, said opposed third and fourth electrical contact means providing a second electrical contact pair;

the first flexible conductive body portion of said first conductive means and the third flexible conductive body portion of said third conductive means being electrically and physically connected to one another to provide a uniformly balanced switch assembly; and

said first conductive body portion, second conductive body portion and third conductive body portion being fixedly mounted to one another on the same end through said respective first base portion, second base portion and third base portion and an insulating member provided between and contacting said second base portion and said first and third base portions

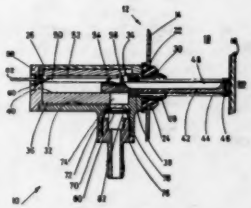
a switch arm mounted to said board for movement between at least a first position and a second position to alternately actuate said first and second electrical contact pairs into and out of electrical engagement, one of said first and second electrical contact pairs being in electrical engagement, and said switch arm and said first and third flexible conductive body portions being constructed and mounted to said board for simultaneous alternate disengagement and engagement of said first and second electrical contact pairs.

4,978,820

DEVICE FOR DETECTING THE POSITION OF A MEMBER MOVABLE INSIDE A STATIONARY MEMBER

Roland Levrai, Stains, and Le Normand Pascal, Aulnay sous Bois, both of France, assignors to Bendix France, Drancy, France

Filed May 30, 1989, Ser. No. 359,072
Claims priority, application France, Jul. 22, 1988, 88 09908
Int. Cl.[5] H01H *35/38*
U.S. Cl. 200—82 D **4 Claims**



1. A device for measuring electrically the position of a movable member relative to a stationary member, the stationary member being a wall of a booster housing and the movable member being piston means dividing the housing into a front chamber and a rear chamber, comprising movable first means which is movable together with the movable member and the movement of which is detected in relation to stationary second means that is stationary relative to the stationary member, wherein the stationary second means is connected with the stationary member outside of the booster housing and on a side the same as the front chamber, the stationary second means including electrical circuit means, and the movable first means sliding relative to the stationary second means and affecting the circuit means to vary operation of the electrical circuit means as a function of position of the movable, first means relative to the stationary second means, the stationary second means including a non-return valve and communicating about the movable first means with the front chamber, the non-return valve permitting one-way flow of medium relative to the front chamber.

4,978,821

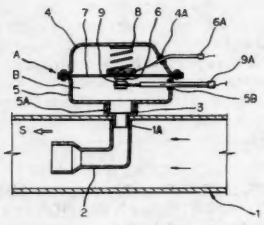
REVERSE FLOW PREVENTION DEVICE FOR COMBUSTION APPARATUS

Jin-Ki Shon, Suwon, Rep. of Korea, assignor to Samsung Electronics Co. Ltd., Rep. of Korea

Filed Dec. 1, 1989, Ser. No. 442,204
Claims priority, application Rep. of Korea, Dec. 26, 1988, 88-17487
Int. Cl.[5] H01H *35/40*
U.S. Cl. 200—83 W **5 Claims**

1. A reverse flow prevention device for a combustion apparatus which is operated by electrical power, and which is provided with a combustion gas discharge tube for discharging the combustion process byproducts, which device comprises:

(a) a reverse flow gas collecting tube installed within said combustion gas discharge tube and open in a direction opposite normal flow of by-products through said gas discharge tube for collecting reversely flowing gas; and



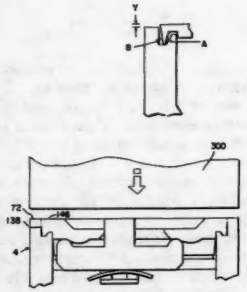
(b) a detection means coupled with said reverse flow gas collecting tube for turning OFF the combustion apparatus and stopping the combustion process when the pressure of the reverse flow gas acting on the detection means is above a certain level.

4,978,822

SWITCH FOR INTEGRATED CIRCUIT PACKAGE

Timothy B. Billman, King, and Roger L. Thrush, Clemmons, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 179,602, Apr. 11, 1988, abandoned.
This application Oct. 12, 1989, Ser. No. 421,308
Int. Cl.[5] H01H *9/04*
U.S. Cl. 200—302.1 **1 Claim**



1. An electrical component comprising:

an insulative housing having a floor and walls upstanding from the floor to form an open upper face, an interior of the walls including a channel which extends around at least a part of a periphery of said housing, and opens upwardly, the walls defining a cavity surrounded by the channel;

an insulative cover member which is profiled for receipt over the insulative housing, the cover member including a peripheral lip which extends downwardly on the cover member for receipt within the upwardly open channel, the lip and the upwardly open channel having complementary surfaces, whereby

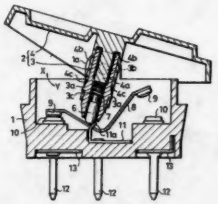
the cover and housing are ultrasonically welded together by the liquidification of the lip and the flowage and solidification of molten material therefrom within said channel, characterized in that the walls of the housing surround the insulative cover member when the insulative cover is ultrasonically welded to the housing, with an upper face of the housing walls being substantially flush with and surrounding an upper surface of the cover member and the cover has a downwardly open channel adjacent to and on the inside of the lip, the downwardly open channel receiving a rim on the housing adjacent to and on the inside of the channel, so that that portion of the lip rendered molten during ultrasonic welding remains in the two channels and does not flow into the cavity.

4,978,823

SEESAW-TYPE SWITCH DEVICE HAVING A SNAP-COUPLED ACTUATOR

Hiroyuki Sato, and Yujiro Shimoyama, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 160,915, Feb. 26, 1988, abandoned.
This application May 9, 1989, Ser. No. 349,880
Claims priority, application Japan, Jun. 1, 1987, 62-83185[U]
Int. Cl.[5] H01H *5/08*
U.S. Cl. 200—437 **4 Claims**



1. A switch device comprising:

a casing having a first end and a second end;

a switch operating member supported for pivotal motion at said first end of said casing, said switch operating member comprising an actuator element and an operating element snap-coupled together in an integral relationship, said actuator element having a throughhole therein forming a first opening and a second opening, said actuator element having formed on first and second opposite faces thereof first and second arresting projections, respectively, said operating element comprising an operating portion and a pair of depending support plates provided in a predetermined spaced relationship extending from said operating portion, each of said depending support plates having an arresting hole formed therein, said operating element further comprising a depending projection positioned between said support plates, said depending projection extending perpendicularly from said operating portion, whereupon when said actuator element and said operating element are snap-coupled together said depending projection is received in said first opening of said through-hole of said actuator element and said arresting projections on said actuator element are received in said arresting holes in said support plates;

a conductor plate supported for pivotal motion within said casing;

an actuator bar positioned in said second opening with a portion of said actuator bar extending out through said second opening of said through-hole in said actuator element and contacting said conductor plate; and

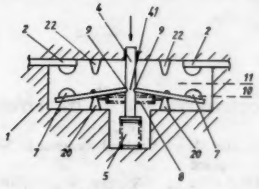
a compression spring positioned in said through-hole intermediate said first opening and said second opening and interposed between one end of said depending projection and an inner end of said actuator bar for urging said actuator bar into contact with said conductor plate at an outer end of said actuator bar, whereby a tilting motion of said switch operating member to slidably move said actuator bar on said conductor plate will cause pivotal motion of said conductor plate to make a switching operation of said switch device.

4,978,824

ELECTRICAL SWITCHES

John W. Allen, West Sussex, England, assignor to Redcliffe Electronics Limited, London, England

Continuation of Ser. No. 213,315, Jun. 30, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,902
Claims priority, application United Kingdom, Jul. 1, 1987, 8715412
Int. Cl.[5] H01H 5/00
U.S. Cl. 200—447 20 Claims



20. An electrical switch comprising:
means defining a hollow housing;
a displaceable actuator at least in part mounted within said housing;
at least a first pair of elongated contact arms disposed within said housing, said contact arms being movable transversely with respect to the direction of displacement of said actuator, each of said contact arms being coupled at a first end thereof to said actuator;
a first pair of electrical contacts, said contacts of said first pair being mounted on respective of said contact arms;
at least a second pair of electrical contacts disposed within said housing for cooperation with respective of said electrical contacts of said first pair of contacts;
means for establishing paths for the flow of electrical current between said electrical contacts and the exterior of said housing;
means for resiliently biasing said contact arms to cause said electrical contacts of said first pair to engage and disengage associated electrical contacts of said second pair of contacts in response to displacement of said actuator; and
at least a pair of fulcrums mounted on said housing, said fulcrums being positioned to engage respective of said contact arms between said electrical contacts of said first pair of contacts and said contact arm first ends, said contact arms pivoting about said fulcrums only during movement of said electrical contacts of said first pair of contacts towards said electrical contacts of said second pair of contacts.

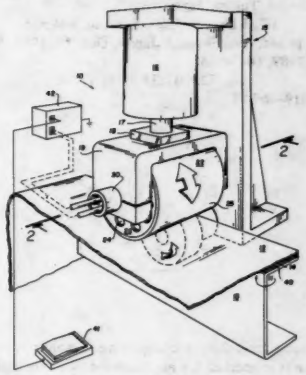
4,978,825

THERMOPLASTIC COMPOSITE INDUCTION WELDER

Wayne W. Schmidt, Placentia, Calif.; William P. Benjamin, Chandler, Ariz., and Robert A. Grimm, Columbus, Ohio, assignors to Northrop Corporation, Hawthorne, Calif.

Filed Nov. 8, 1989, Ser. No. 433,883
Int. Cl.[5] H05B 6/10
U.S. Cl. 219—104.3 11 Claims

1. Method of induction bonding of a continuous lap joint between two parts, at least one of which is thermoplastic, along which joint has been laid a susceptor for r-f heating, comprising:
positioning the parts together, in combination with a susceptor material therebetween in overlapping relationship to form a joint,
positioning an induction coil on one side of said joint in a plane parallel to the joint for radiating r-f energy into a region of said joint and for heating said susceptor material,
forming said induction coil as a flat coil,
simultaneously pressing on said region with a roller made of non-magnetic, non-conductive semi-rigid material mounted about said coil so that said coil lies inside said roller, said roller deforming to establish an area of pressure contact to cover and define an extended region of consolidation over the path of r-f heating in said joint.

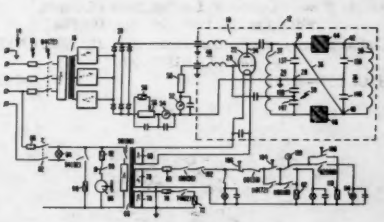


4,978,826

HIGH FREQUENCY OVEN WITH PLURAL HEATING LEVELS AND AN IMPROVED EFFICIENCY OF POWER TRANSFER

J. W. DeRuiter, Eindhoven, and Lucas A. Butot, Amsterdam, both of Netherlands, assignors to Super M Associates, Westport, Conn.

Continuation-in-part of Ser. No. 24,064, Mar. 10, 1987, Pat. No. 4,812,609. This application Jun. 16, 1988, Ser. No. 207,561
Int. Cl.[5] H05B 6/54
U.S. Cl. 219—10.81 30 Claims



1. In a high-frequency dielectric oven for cooking foodstuff, including a cavity for receiving the foodstuff when cooking, a high frequency oscillating circuit, including a power tube, having an operating voltage defined by a power supply voltage applied thereto, said power tube operating for generating a high frequency electric signal, and electrode means for introducing an electric field into the cavity to transfer power from the oscillating circuit to the foodstuff, the improvement comprising power increasing means for increasing the power transferred from the oscillating circuit to the foodstuff without substantially increasing the operating voltage of the tube and without requiring a shift of a phase or a frequency of operation thereof, thereby improving stability and controllability of power transferred to the foodstuff.

4,978,827

MACHINING TANK WITH DECOMPOSED GAS REMOVAL

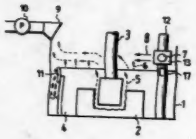
Yozo Sakai, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 4, 1989, Ser. No. 444,905

Claims priority, application Japan, Dec. 16, 1988, 63-317769; Mar. 29, 1989, 64-76988

Int. Cl.[5] B23H 7/00, 11/00

U.S. Cl. 219—69.11 8 Claims



1. A machining device comprising: a solution in which a workpiece is immersed for acceleration of a machining operation; a machining vessel containing said solution in which said workpiece has been immersed; air stream producing means for producing a stream of air above the surface of said solution in said machining vessel in such a manner that said stream of air flows in parallel with the surface of said solution in said machining vessel; and air stream sucking means for sucking said stream of air thus produced, thereby to remove gas produced from said solution during machining, which further comprises: means for positioning at least one of said air stream producing means and air stream sucking means to a predetermined height from the surface of said solution in said machining vessel irrespective of a change in the level of said solution in said machining vessel.

4,978,828

DEVICE AND METHOD FOR CONFIRMING THAT A WIRE ELECTRODE FOR A WIRE CUTTING DISCHARGE MACHINE HAS PENETRATED A WIRE GUIDE SECTION ON A WIRE TAKE-OUT SIDE

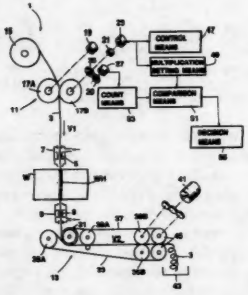
Masahito Umetsu, Atsugi, and Morikatsu Matsuda, Isehara, both of Japan, assignors to Amada Company, Limited and Amada Wasino Company, Limited, both of, Japan

Filed Jun. 21, 1989, Ser. No. 369,524

Claims priority, application Japan, Jun. 21, 1988, 63-151293

Int. Cl.[5] B23H 7/10

U.S. Cl. 219—69.12 4 Claims



1. A device for confirming that a wire electrode for a wire cutting discharge machine has penetrated a wire guide section on a wire take-out side comprising:

a speed detection means for detecting the delivery speed of the wire electrode by detecting the speed of movement of a wire supply means for supplying the wire electrode;

a speed setting means for presetting a fixed speed of movement larger than the wire delivery speed of the wire supply means;

a comparison means for comparing the value detected by the speed detection means with the set value of the speed setting means; and

a decision means for deciding from the output of the comparison means whether or not the wire electrode has penetrated the wire guide section on a wire take-out side.

4,978,829

ELECTRIC DISCHARGE MACHINING POWER SUPPLY CIRCUIT

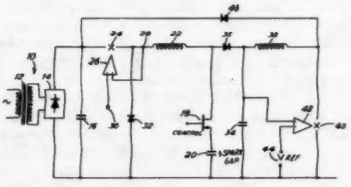
David Gurwicz, Gateshead, England, assignor to Nada Electronics Limited, England

Filed May 25, 1989, Ser. No. 357,009

Claims priority, application United Kingdom, May 27, 1988, 8812675; Jun. 30, 1988, 8815549

Int. Cl.[5] B23H 1/02

U.S. Cl. 219—69.13 7 Claims



1. A control circuit for electric discharge machining, for supplying current to a spark gap between a workpiece and tool, comprising a DC source, an inductive circuit connected to the DC source through regulating means arranged to maintain a constant current in the inductive circuit, switching means connected to the inductive circuit and to the spark gap and operable to divert the current in the inductive circuit to the spark gap, and means for establishing a predetermined voltage across the switching means and spark gap.

4,978,830

LASER TRIMMING SYSTEM FOR SEMICONDUCTOR INTEGRATED CIRCUIT CHIP PACKAGES

Michael A. Millerick, San Jose, and Michael W. Patterson, Pleasanton, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 27, 1989, Ser. No. 316,501

Int. Cl.[5] B23K 26/00, 26/14

U.S. Cl. 219—121.67 16 Claims

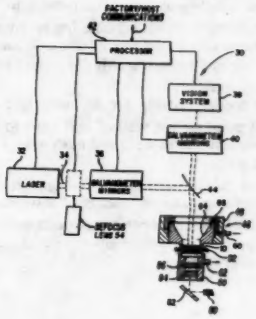
1. An apparatus for processing integrated circuit chip packages, each said chip package having a plurality of closely spaced leads, and wherein said chip package further includes dambars for alignment of the leads and wherein said apparatus is adapted to remove said dambars as well as any plastic flash trapped by the dambars, said apparatus comprising:

laser for generating a laser beam;

means for defocusing the beam of the laser such that its area is increased and areal intensity is reduced at the point of interaction with the chip package; and

processor means for controlling the laser and the defocusing means whereby said beam may first be used to cut the

dambars and thereafter said beam is defocusing by said attenuation means such that the plastic flash trapped by



the dambars can be vaporized and the remainder of the dambars can be removed.

4,978,831

CARBON DIOXIDE WELDING GUN

Jon C. Lian, No. 8-6, Chung Chen E. Rd., Tansui, Taipei Hsien, Taiwan

Continuation-in-part of Ser. No. 255,462, Oct. 11, 1988, Pat. No. 4,945,208. This application Dec. 21, 1989, Ser. No. 454,391

Int. Cl.[5] B23K *9/24*

U.S. Cl. 219—137.61 **1 Claim**

1. In a carbon dioxide welding gun, the improvement comprising:

an annular support member (51) for a welding rod guide member; said support member comprising an axially elongated cup-shaped portion having an externally threaded section(511) at one end thereof for mounting the support member in a welding gun and an externally threaded section(512) at its other end;

an annular welding rod guide member 10 seated in the annular cup-shaped portion of the support member; said guide member having a portion thereof projecting axially beyond the support member, the projecting portion of the electrode guide member having a frusto-conical external surface; and

an annular contact tip member(52) fitting onto the projecting portion of said guide member; said tip member having a frusto-conical internal surface mated to the external surface contour on the projecting portion of the guide member, a first internally threaded end section (522) having meshed engagement with the externally threaded section of the annular support member, and a second end section having an external recess (52) facing axially away from the guide member;

said support member, guide member, and tip member having axially aligned passages extending therethrough for slidable accommodation of a welding rod; the tip member having its external recess(521) in near adjacency to the consumable end of the welding rod during normal usage of the welding gun.

4,978,832

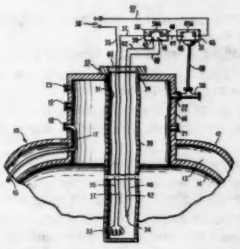
PRESSURIZATION OF LIQUID CARBON DIOXIDE CYLINDER

Julius Rubin, 54 Madison Ave., Franklin Square, N.Y. 11010

Filed Sep. 15, 1989, Ser. No. 408,113

Int. Cl.[5] H05B *3/78*

U.S. Cl. 392—400 **14 Claims**



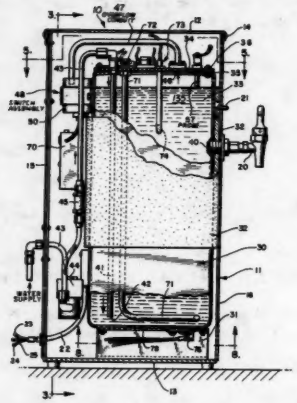
1. In a low-pressure, insulated cylinder for the storage of liquid carbon dioxide, the top of said cylinder being joined to a collar with a closed top having a central aperture, the improvement of a mechanism for maintaining the pressure in said cylinder in a predetermined range, which comprises a tube with a sealed bottom end positioned near the bottom of said cylinder, the top end end of said tube being fastened to said central aperture, an electric heating element positioned in said tube near said sealed end, two heater wires connected to said element extending out of said top end, a temperature sensor positioned in said tube slightly spaced from said element and extending out of said top end to a thermostat of the type that opens the electric circuit therethrough when said temperature sensor detects a predetermined maximum temperature, a pressure-stat having a capillary sensor and being of the type that closes the electric circuit therethrough when the pressure in said cylinder drops to a predetermined minimum and opens said electric circuit when the pressure in said cylinder rises to a predetermined maximum, said capillary sensor being connected to said collar, said pressure-stat and said thermostat being connected in series through a first reaction post of each, one of said heater wires being connected to a source of electricity, the other of said heater wires being connected to a second reaction post of said pressure-stat or said thermostat, and a wire from said source of electricity connected to the second reaction post of said pressure-stat or said thermostat not connected to the other of said heater wires.

4,978,833

HOT WATER DISPENSER HAVING IMPROVED WATER TEMPERATURE CONTROL SYSTEM

John T. Knepler, Chatham, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.

Filed Jan. 27, 1989, Ser. No. 302,797
Int. Cl.[5] H05B 3/78; F24H 1/20
U.S. Cl. 392—449 **13 Claims**



5. A hot water dispensing apparatus comprising:

a hot water reservoir;

means including a resistance heating element within said reservoir operable from an applied electric current for heating water in said reservoir;

inlet means for admitting cold water into said reservoir;

outlet means for discharging heated water from said reservoir;

said inlet means including flow regulating means for controllably admitting water to said reservoir at a first predetermined flow rate and said outlet means controllably discharging water from said reservoir at a second predetermined flow rate, said first predetermined flow rate being less than said second predetermined flow rate;

temperature regulating means responsive to the temperature of water in said reservoir for controlling the application of electric current to said resistance heating element to maintain the water in said reservoir at a substantially constant predetermined temperature;

said regulating means including a current switching device in series-circuit relationship with said resistance heating element;

said current switching device in operation generating heat; and

means for thermally coupling said current switching to said reservoir whereby heat generated in the operation of said device is transferred to said reservoir.

4,978,834

METHOD AND APPARATUS FOR REMOTELY WELDING A BUSH INSIDE A TUBE, IN PARTICULAR IN A STEAM GENERATOR IN A NUCLEAR POWER STATION

Jacques Griffaton, Chalon-sur-Saone, France, assignor to Framatome, Courbevoie, France

Filed Oct. 16, 1989, Ser. No. 422,363
Claims priority, application France, Oct. 14, 1988, 88 13602
Int. Cl.[5] B23K 26/00
U.S. Cl. 219—121.63 **6 Claims**

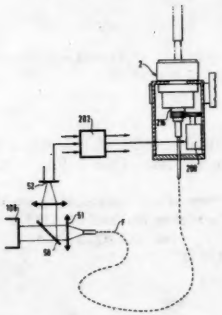
1. A method of remotely welding a bush in a tube, in particular in a steam generator of a nuclear power station, in order to make a connection firstly between a receiver tube having an axis, and secondly a bush to be welded which includes a wall and which has previously been installed in the tube, the method comprising:

an operation of inserting a weld head into said receiver tube, said head including an optical cell which itself comprises:

optical reflection means suitable for receiving a welding light beam along said axis of the receiver tube and for reflecting said beam towards the wall of said bush to be welded; and

focusing means suitable for focusing said beam on an impact point on the wall of said bush to be welded in such a manner as to weld said bush to said receiver tube at said point;

said method further comprising an operation of creating such a welding beam by means of a welding laser, said beam being suitable for performing said welding, said laser being situated in a beam creation zone at a distance from said receiver tube;



an operation of placing a transport optical fiber for receiving said welding beam and for conveying it to said optical cell; and

an operation of rotating the impact point by rotating at least one of the optical reflection means of said optical cell about said receiver tube axis in order to cause said impact point to describe at least an arc on said bush to be welded so as to form a weld fillet;

wherein said rotation of the optical reflection means is driven by a motor situated outside said receiver tube facing the inlet thereto and mechanically connected to said optical reflection means by a tubular extender assembly, said assembly being disposed in said tube around said transport optical fiber in such a manner as to avoid rotating said fiber.

4,978,835

METHOD OF CLAMPING ELECTRICAL CONTACTS FOR LASER BONDING

Nicolaas G. Luijtjes; Claire T. Galanakis, and Barry H. Whalen, all of Austin, Tex., assignors to Microelectronics and Computer Technology Corporation, Austin, Tex.

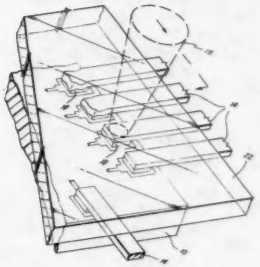
Filed Aug. 21, 1989, Ser. No. 396,254
Int. Cl.[5] B23K 26/00
U.S. Cl. 219—121.64 **9 Claims**

1. A method of bonding a first plurality of electrical contacts to a second plurality of electrical contacts comprising,

aligning the first contacts over the second contacts,

placing a diaphragm member which includes a laser absor-

bent material for absorbing laser energy against the first contacts,



applying a force to the diaphragm in a direction to pull the first contacts toward the second contacts, and

bonding the first contacts to the second contacts with a laser.

4,978,836

CONTINUOUS OVEN

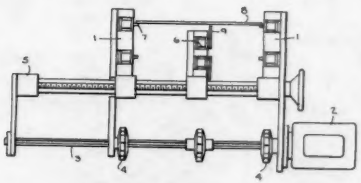
Walter Dieudonnè, Kälberau; Norbert Mittelstädt, Hanau, and Kurt Reul, Gründau, all of Fed. Rep. of Germany, assignors to Heraeus Quarzschmelze GmbH, Hanau, Fed. Rep. of Germany

Filed Aug. 15, 1989, Ser. No. 393,993

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1988, 3841447

Int. Cl.[5] F27B *9/06*; F27D *11/00*

U.S. Cl. 219—388 **14 Claims**



1. A continuous oven for heat-treatment of circuit boards with electrical or electronic components to be soldered, comprising:

an electrical infrared heat radiators for the thermal treatment of plate-like components;

a conveying device having two synchronously driven, continuous drive band spaced-apart to each other in a parallel relationship, each having support elements for the plate-like components; and

an auxiliary drive band disposed between said two drive bands and parallel thereto and provided with projections which are directed perpendicular to the band plane of the band which is made by said two drive bands and the length of which does not rise over a support surface for the plate-like components made by said support elements.

4,978,837

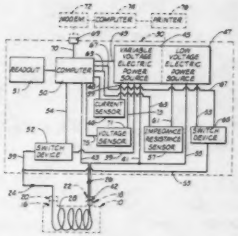
METHOD AND APPARATUS FOR ELECTRICALLY HEAT WELDING THERMOPLASTIC FITTINGS

Dean E. Eggleston, Tecumseh, Okla., assignor to Central Plastics Company, Shawnee, Okla.

Filed Apr. 13, 1990, Ser. No. 508,419

Int. Cl.[5] H05B *1/02*

U.S. Cl. 219—497 **26 Claims**



1. An improved method of electrically heat welding a thermoplastic fitting having an electric resistance heating element disposed therein whereby a predetermined regulated quantity of electric power is supplied to the heating element during the welding process comprising the steps of:

(a) connecting said heating element of said fitting to an electric power source;

(b) sensing the initial temperature of said heating element and said fitting;

(c) supplying electric power to said heating element at a substantially constant voltage whereby said element is heated;

(d) sensing the initial magnitude of the current flowing through said heating element and comparing such magnitude and said initial temperature of said heating element with predetermined current levels for heating elements of various sizes of fittings at various temperatures to thereby determine the size of said fitting being welded, the total time the controlled substantially constant voltage should be supplied to said heating element and the current levels for such size of fitting which should result over said time period to insure the making of a high quality weld;

(e) continuing to sense the magnitudes of the current flowing through said heating element over the time said substantially constant voltage electric power is supplied thereto and comparing such magnitudes at predetermined time intervals with predetermined current levels for the size of fitting determined in step (d) to thereby determine if the welding process is proceeding abnormally at such time intervals; and

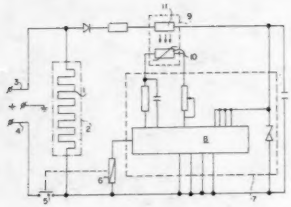
(f) terminating the supply of electric power to said heating element at the end of the total time required to make a high quality weld or when it is determined that said welding process is proceeding abnormally in step (e) unless the abnormality is that the current level is too high; and

(g) when the abnormality determined in step (e) is that the current level is too high, reducing said voltage to that which results in current levels substantially equal to said predetermined current levels for the size of said fitting being welded for the remaining of the time determined in step (d) and then terminating said supply of electric power to said heating element of said fitting.

4,978,838
DEVICE FOR ELECTRONIC CONTROL OF THE SUPPLY OF A HEATING RESISTANCE

Antonio B. Sanjuan, c/o Moulinex Espana S.A. Diagonal 622, Barcelona 21, Spain

Filed Nov. 30, 1989, Ser. No. 443,378
Claims priority, application France, Dec. 12, 1988, 88 16331
Int. Cl.[5] H05B *1/02*
U.S. Cl. 219—497 5 Claims



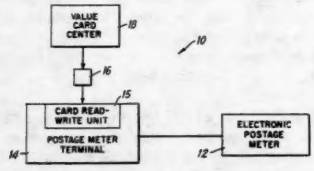
1. Electronic control device of the electrical supply of a heating resistance adapted to heat a cooking or grilling enclosure, and comprising a detector adapted to detect a first temperature bearing a predetermined relationship to a second temperature prevailing in the enclosure and electrically connected to an electronic timing circuit adjustable according to a selected temperature chosen by the user, and adapted particularly to control the opening of a switch mounted in series with said resistance,

the detector being mounted outside the enclosure and comprising a variable resistance which is in thermal relationship with a calibrated resistance such that heating of the variable resistance by said calibrated resistance simulates said second temperature prevailing in the enclosure, and which is electrically connected to the timing circuit so as to control said circuit, the thermal characteristics of the detector being such that the timing circuit controls the opening of a switch substantially at the instant at which the heating resistance causes said second temperature to equal said selected temperature.

4,978,839
POSTAGE METER VALUE CARD SYSTEM

Robert K. T. Chen, Wilton; Winslow E. Jackson, Monroe, and Paul H. K. Kim, Wilton, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 153,398, Feb. 8, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,689
Int. Cl.[5] C06K *15/20*
U.S. Cl. 235—375 17 Claims



1. A postage meter recharging system comprising:

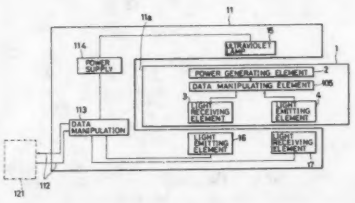
a card center for receiving funds from a customer and issuing a card means bearing postage funds encoded therein; and

postage meter terminal means connected to at least one postage meter for transferring at least a portion of said postage funds from said card means to the postage meter vault.

4,978,840
IC CARD HAVING ENERGY INPUT AND DATA EXCHANGE ELEMENTS ON OPPOSITE SIDES THEREOF

Takao Anegawa, Kitakyusyu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 28, 1988, Ser. No. 149,598
Claims priority, application Japan, Jan. 28, 1987, 62-16253
Int. Cl.[5] G06K *19/06*
U.S. Cl. 235—492 13 Claims



1. An IC card for receiving external energy and transmitting and receiving data to and from an external data read/write unit with external energy, comprising:

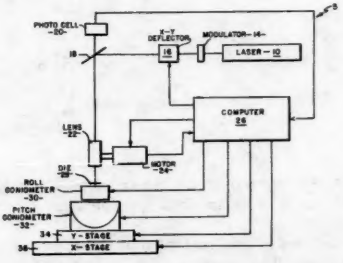
a first main surface having a power generating element for receiving external energy to generate power; and

a second main surface having data communication elements for transmitting and receiving data energy.

4,978,841
AUTOMATIC LEVELING SYSTEM AND A METHOD OF LEVELING A WORKPIECE BASED ON FOCUS DETECTION

William A. Barrett, San Jose, and Amitabh Puri, Santa Clara, both of Calif., assignors to Lasa Industries, Inc., San Jose, Calif.

Filed Aug. 24, 1989, Ser. No. 398,276
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—548 10 Claims



1. An Automatic leveling apparatus comprising:

an automatic laser focus system capable of determining the focus of laser light reflected from a workpiece, said automatic laser focus system having a control computer;

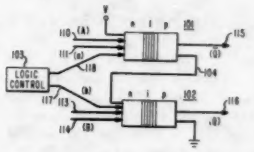
x and y translation stages for moving said workpiece in a plane, said stages controlled by said computer; and

pitch and roll goniometers controlled by said computer, said goniometers being adjustable so as to level the workpiece based on the determined focus of the laser light.

4,978,842
PROGRAMMABLE OPTICAL LOGIC DEVICE WITH COMPLEMENTARY INPUTS

Harvard S. Hinton, Naperville; Anthony L. Lentine, St. Charles, both of Ill., and David A. B. Miller, Fair Haven, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 21, 1989, Ser. No. 341,524
Int. Cl.[5] H01J *31/50*
U.S. Cl. 250—213 A 5 Claims



1. Semiconductor apparatus comprising

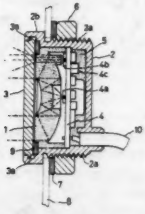
a symmetric self-electrooptic effect device including first and second optical input ports and at least a first output port, said device for generating an output lightwave signal at the at least first output port and for changing the output lightwave signal from a first level to a second level when a ratio of powers signals at said first input port to second optical input port exceeds at first threshold, said input lightwave signal at said first port including first and second data signal beams, said input lightwave signal at said second port including complementary representations of said first and second data signal beams, and

means coupled to said first and second input ports for optically controlling the device to assume an initial state for generating the output lightwave signal at said first level and thereby causing the semiconductor apparatus to perform a Boolean function on subsequent input lightwave signals, said Boolean function chosen from the group consisting of AND, NAND, OR, and NOR.

4,978,843
PHOTOELECTRIC SENSOR HAVING A FOLDED LIGHT PATH

Masami Yamakawa, Tokyo, Japan, assignor to Aisens Co., Ltd., Japan

Filed Jul. 18, 1989, Ser. No. 381,968
Claims priority, application Japan, Sep. 10, 1988, 63-119083[U]
Int. Cl.[5] H01J *3/14*
U.S. Cl. 250—216 13 Claims



1. A photoelectric sensor comprising:

a transparent optical body of a semicrescent-shaped section having a circular flattened objective surface as a front surface and a circular convex surface as a rear surface;

a circuit block behind said transparent optical body;

a tubular casing having an opening side and incorporating said optical body and said circuit block therein;

a transparent protector fitted on the opening side of said casing;

a lock nut to be engaged with an outer circumference of said casing;

said optical body being, on a central part of said front surface, provided with a first continuous concave recess having about one-third diameter of said front surface, while being, on a central part of said rear surface, provided with a second recess having a convex bottom and a smaller diameter than said first recess, said second recess forming a light collecting lens opposed to a photoelectric converting element;

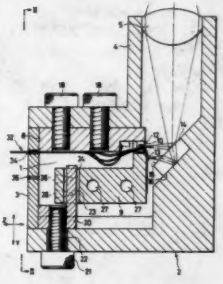
a concave bottom of said first recess being formed as a second reflective mirror by a vacuum evaporating plating means;

a surface other than said second recess of said rear surface being formed as a first reflective mirror by a vacuum evaporating plating means, and a periphery of said rear surface having a skirt member and said first reflective mirror being provided with a light collecting means for transmitting a luminous flux; and said circuit block being, on its front surface, with said photoelectric converting element and an operation indicating lamp and, on its front and rear surface, provided with a plurality of electronic parts, and a periphery of said circuit block being directed to said skirt member.

4,978,844
OPTICAL ELEMENT CARRYING PRINTED SUBSTRATE AND OPTICAL HEAD DEVICE USING THE SUBSTRATE

Takashi Ujihara, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 25, 1989, Ser. No. 426,347
Claims priority, application Japan, Jul. 31, 1986, 61-180965; Jul. 31, 1986, 61-180966
Int. Cl.[5] H01J *3/14, 5/16*
U.S. Cl. 250—216 6 Claims



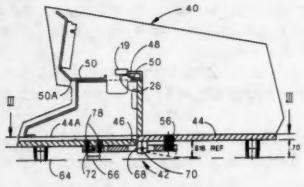
1. An optical head device, comprising; a light-emitting element, an objective lens for converging light emitted from said light-emitting element onto a surface of an optical information recording medium, a light-receiving element for receiving light reflected from said surface and for generating an electrical signal in response thereto, and a holder mechanism for holding said light-emitting element and said light-receiving element, said holding mechanism including a package body provided with a partly open interior space and a cover for closing an opening portion of said interior space, said light-emitting element and said light receiving element being disposed within said interior space.

4,978,845

CARD COUNTER WITH SELF-ADJUSTING CARD LOADING ASSEMBLY AND METHOD

James E. Hill, Wheeling, Ill., assignor to Dynetics Engineering Corporation, Lincolnshire, Ill.

Filed Sep. 28, 1989, Ser. No. 413,865
Int. Cl.[5] G01V 9/02
U.S. Cl. 250—222.1 **24 Claims**



1. In a card counter having a housing with an opening for receipt and removal of a rack of cards inserted therethrough in an insertion direction to a position beneath a sensing location and a sensor for detecting the edges of cards at the sensing location spaced beneath the sensor by a preselected distance and means responsive to the sensor by a preselected distance and means responsive to the sensor for counting detected cards, the improvement being a self-adjusting card loading assembly, comprising:

a member for underlying support of a rack of cards loaded through the opening to be counted;

a member for mounting the sensor above the support member for scanning lateral movement in a direction transverse to the preselected insertion direction; and

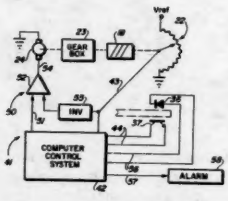
means for causing the card support member and the sensor mounting member to move relatively closer to each other after loading in a vertical direction substantially transverse to that of the scanning lateral movement and the insertion direction until the edges of any cards supported by said underlying support member are correctly positioned at the sensing location for optimal sensing while concurrently restraining the rack support member against lateral movement.

4,978,846

ANGULAR POSITION MEASUREMENT APPARATUS

William J. Buote, Natick, Mass., assignor to Zymark Corporation, Hopkinton, Mass.

Filed Dec. 14, 1989, Ser. No. 450,753
Int. Cl.[5] G01D 5/34
U.S. Cl. 250—231.13 **20 Claims**



1. Angular position measurement apparatus comprising:

rotatable means;

potentiometer means coupled to said rotatable means and adapted to produce a first output signal indicative of the angular position thereof;

element means retaining a plurality of annularly distributed gradations representing different angular positions of said rotatable means;

detector means for producing second output signals in response to alignment thereof with any of said gradations;

drive means for producing relative movement between said element means and said detector means in response to rotation of said rotatable means so as to render said second output signal indicative of an angular position of said rotatable means; and

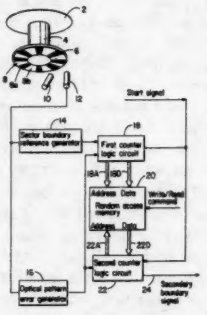
comparator means for comparing the angular positions indicated by said first and second output signals.

4,978,847

PULSE GENERATOR AND DISK SECTOR BOUNDARY SIGNAL GENERATOR WITH WOW AND FLUTTER COMPENSATION

Seiji Fukunaga, Fujisawa; Takashi Nakamura, Yokohama, and Hiroyuki Ono, Fujisawa, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 6, 1989, Ser. No. 446,904
Claims priority, application Japan, Dec. 9, 1988, 63-309890
Int. Cl.[5] G01D 5/34
U.S. Cl. 250—231.14 **6 Claims**



1. A pulse generator associated with the rotor of a motor comprising

a pattern provided on the rotor of the motor which rotates in unison with the rotor;

a pattern sensor which detects movement of said pattern due to rotation of the rotor and generates pulses from the sensor output following rotor rotation;

said pattern being set to provide a sensor output with a frequency not less than ten times the frequency of a flutter component developed as said pattern rotates with said rotor;

a first pulse generating means for receiving the output of said sensor, eliminating from said output an error component of said sensor, an error component of said pattern, and the flutter component of said motor, leaving uneliminated a wow component of said motor, to generate first pulses with a predetermined frequency in synchronization with only the wow component of said motor;

a second pulse generating means for receiving the output of said sensor eliminating from said output the error component of said sensor and a higher frequency error component of said pattern, leaving uneliminated a lower frequency error component of said pattern and the wow and flutter components of said motor, to generate second pulses with a frequency higher than the frequency of said first pulses in synchronization with the lower frequency error component of said pattern and the wow and flutter components of said motor;

a first counting means for counting said second pulses generated by said second pulse generating means in the interval between two successive first pulses issued by said first pulse generating means;

a storage means for storing a counter value issued by said

first counting means at every pulse period of said first pulse generating means;

a second counting means for reading said counter value stored in said storage means to generate a pulse when said second counting means counts the same number of second pulses outputted from said second pulse generating means due to a rotation of that part of said pattern corresponding to said read counter value as said read counter value.

4,978,848

SUSPENSION CONTROL SYSTEM FOR A MOTOR VEHICLE

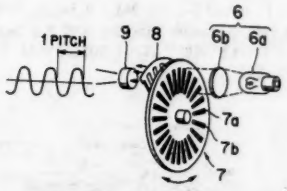
Yutaka Hiwatashi; Katsuyoshi Kamimura, and Atsushi Mine, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1989, Ser. No. 334,544

Claims priority, application Japan, Apr. 12, 1988, 63-49077[U]

Int. Cl.[5] G01D *5/34*

U.S. Cl. 250—231.16 **10 Claims**



1. An incremental-type rotary encoder for detecting a vehicle height corresponding to a relative displacement between a body of a vehicle and a suspension mechanism, comprising:

a rotary disc operatively connected to said suspension mechanism and adapted to rotate depending on said relative displacement between said suspension mechanism and said body of the vehicle;

two sets of first designating means provided on said rotary disc for designating positions assumed by said rotary disc and each set, with respect to the other, having a different phase in a rotational direction of said rotary disc;

two sets of first detector means disposed opposite to said two sets of first designating means, respectively, for producing a signal representing said relative displacement of said rotary disc;

second designating means of semi-circular shape provided on said rotary disc for designating one of an upper and a lower range with respect to a neutral position of the vehicle height, said second designating means having an edge corresponding to said neutral position; and

second detector means for producing a first signal representing that said vehicle height is within said one of the upper and lower ranges when said second detector means is disposed opposite to said second designating means, and producing a second signal representing that said vehicle height is within the other of the upper and lower ranges when said second detector means is not disposed opposite to said second designating means.

4,978,849

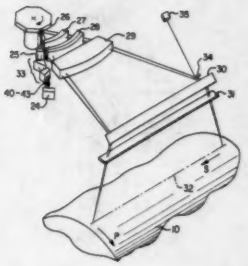
PEL PLACEMENT CORRECTION IN THE SCAN DIMENSION OF A MULTIPLE BEAM LASER SCANNING SYSTEM

Joan S. Goddard, Boulder; Wayne A. Overby, and James A. Valent, both of Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 1, 1989, Ser. No. 388,534

Int. Cl.[5] G01D *15/14*

U.S. Cl. 250—235 **13 Claims**



1. A method of correcting picture element (pel) placement in the scan direction of a multiple beam laser scanning system comprising the steps of:

sensing the position in the scan at which a reference laser beam turns on;

adjusting the position of said reference laser beam to turn on at a desired point in said scan;

sensing the position in said scan at which a non-reference laser beam turns on;

adjusting the position of said non-reference laser beam to turn on at the same position in said scan as said reference laser beam; and

writing pels produced by both reference and non-reference beams in accordance with the adjusted positions to thereby correct for the effects of mechanical and electrical skew.

4,978,850

OPTICAL SENSOR SYSTEM

Akihisa Nakamura, and Hideo Okamoto, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 18, 1989, Ser. No. 353,974

Claims priority, application Japan, May 18, 1988, 63-121455

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.11 **3 Claims**

1. An optical sensor system, comprising:

a light source;

light projecting means carried by a sensor head for projecting an incident light beam upon an object to be measured;

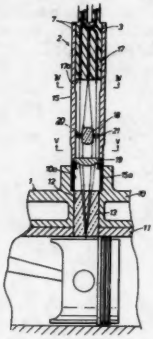
a first flexible optical fiber cable for conducting a light beam from said light source to said light projecting means, said light projecting means substantially consisting of an adjoining and surfaces of said first flexible optical fiber cable;

light receiving means also carried by said sensor head for receiving a light beam reflected from said object to be measured as a result of projecting said incident light beam upon said object to be measured;

photoelectric conversion means for converting a light beam received by said light receiving means into a electric signal representing a measurement result;

a plurality of second flexible optical fiber cables for conducting said reflected light beam to said photoelectric conversion means, said light receiving means substantially consisting of end surfaces of said second optical fiber cables surrounding said end surface of said first optical fiber cable in a coplanar relationship; and

a lens system interposed between said end surfaces of said first and second optical fiber cables and said object to be measured, and comprising a first lens through which both said incident light beam and said reflected light beam pass,



and a second lens having a smaller diameter than said first lens and disposed in a coaxial relationship with said first lens so as to be in the path of said incident light beam and clear of the path of said reflected light beam.

4,978,851

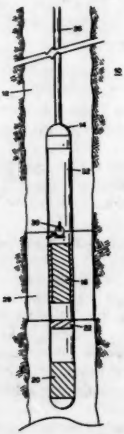
METHOD AND APPARATUS FOR MEASURING SUBSURFACE CHARACTERISTICS USING PULSED NEUTRON/GAMMA RAY LOGGING

Arthur H. Youmans, Houston, Tex., assignor to Western Atlas International Inc.

Continuation-in-part of Ser. No. 721,109, Apr. 19, 1985. This application Feb. 19, 1987, Ser. No. 16,168

Int. Cl.[5] G01V *5/10*

U.S. Cl. 250—270 **3 Claims**



1. A method of directly measuring the ratio of the abundance of a first and second element within a subsurface earth formation surrounding a bore hole without interference from said elements within said bore hole, comprising the steps of:

positioning an instrument within said bore hole adjacent said earth formation, said instrument having a pulsed neutron source and a high resolution gamma ray detector;

isolating a portion of said instrument and a volume of said bore hole proximate said portion of said instrument, in an envelope having neutron absorbing materials in the materials of its construction, said portion of said instrument including at least said high resolution gamma ray detector;

filling said envelope with a neutron absorbing fluid until substantially all of the bore hole fluid between said envelope and said bore hole is displaced, said neutron absorbing fluid adapted to prevent emission of gamma rays upon neutron capture;

cyclically irradiating said earth formation proximate said instrument with a burst of neutrons;

measuring after a preselected time interval during the quiescent period following each of said bursts of neutrons the capture gamma rays emitted from the capture of said neutrons within said formation, the step of measuring further comprising detecting with said high resolution gamma ray detector said capture gamma rays emitted from the capture of said neutrons, and producing signals corresponding to the energies of said detected capture gamma rays; and

deriving from said measure of said capture gamma rays the ratio of said abundances of said first and second elements within said formation by isolating said signals corresponding to the energies of capture gamma rays characteristic of said first and second elements, and deriving a ratio of said abundances of said first and second elements from said isolated signals.

4,978,852

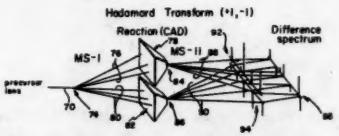
HADAMARD TRANSFORM MEASUREMENT OF MSN FOURIER-TRANSFORM MASS SPECTRA

Evan R. Williams, Palo Alto, Calif., and Fred W. McLafferty, Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation-in-part of Ser. No. 241,869, Sep. 8, 1988, Pat. No. 4,931,639. This application Mar. 28, 1990, Ser. No. 500,483

Int. Cl.[5] H01V *49/00*; **B01D** *59/44*

U.S. Cl. 250—282 **7 Claims**



1. A method of analyzing molecular samples, comprising:

providing a plurality of n different primary ions in a molecular sample;

mass-selecting said n primary ions to produce first and second sets of precursor ions, each set including about 0.5n ions;

dissociating each of said first and second sets of precursor ions to form corresponding first and second sets of daughter ions;

mass-selecting said first set of daughter ions to produce a corresponding first mass-selected daughter ion set;

mass-selecting said second set of daughter ions to produce a corresponding second mass-selected daughter ion set;

measuring the abundances of said first and second sets of daughter ions and subtracting one set from the other to obtain a difference spectrum of both positive and negative abundance values;

repeating n times the step of mass-selecting said n primary ions to produce n different first and second sets of precursor ions, each having a different combination of primary ions, and for each set of precursor ions dissociating the precursor ions to produce corresponding sets of daughter ions, mass-selecting the sets of daughter ions, measuring the abundances of the first and second sets of daughter ions and subtracting one set from the other for each of the n sets of precursor ions to obtain n difference spectrums of

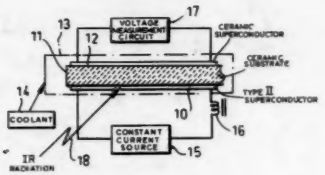
both positive and negative abundance values for each of the mass values represented in the n different spectra, wherein the step of measuring the abundances of each of said first and second sets of daughter ions is carried out through a Hadamard of differences transform.

4,978,853

FLUX-MOTION INDUCED BOLOMETER BASED ON CERAMIC SUPERCONDUCTIVE ELEMENTS

Mohamed A. Hilal, Madison, Wis., assignor to International Superconductor Corp., N.Y.

Filed Mar. 17, 1989, Ser. No. 325,658
Int. Cl.[5] H01L *39/00*
U.S. Cl. 250—336.2 **9 Claims**



1. A bolometer, comprising:

a magnetic-flux-passing substrate having opposite surfaces;

a pick-up, superconductive film on one of said surfaces for exposure to infrared radiation to be measured;

flux-responsive indicating means along the other of said surfaces flux-coupled to said pick-up superconductive film through said substrate;

an electric current source connectable in circuit with said pick-up superconductive film for passing an electric current therethrough;

means connected across said flux-responsive indicating means for measuring voltage generated therein as a result of flux motion induced by infrared irradiation of said pick-up film; and

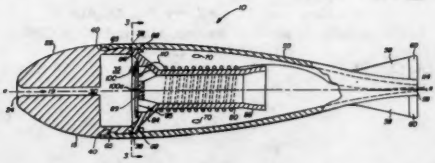
means for cooling said film to a temperature below a critical temperature of the superconductive film.

4,978,854

BIOLUMINESCENT DETECTOR

David Lapota; Gary F. Mastny, both of San Diego, and Hugh D. Copeland, Chula Vista, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1989, Ser. No. 395,239
Int. Cl.[5] G01N *21/76*
U.S. Cl. 250—361 C **26 Claims**



1. A bioluminescent detector, comprising:

a laminar flow chamber having a gently radiused inlet port and an outlet port;

a turbulent flow chamber having an inlet port and at least one outlet port, said inlet port of said turbulent flow chamber being in fluid communication with said outlet port of said laminar flow chamber; and

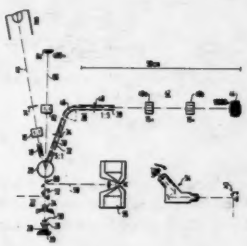
a photon detecting network means mounted within said turbulent flow chamber for detecting photons within said turbulent flow chamber, said photon detecting network means providing an output functionally related to the intensity of the detected photons.

4,978,855

ELECTRON MICROSCOPE FOR INVESTIGATION OF SURFACES OF SOLID BODIES

Helmut Liebl, Etching, and Bertold Stauffiger, Garching, both of Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Goettingen, Fed. Rep. of Germany

Filed Feb. 7, 1990, Ser. No. 476,973
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3904032
Int. Cl.[5] H01J *37/26*
U.S. Cl. 250—310 **16 Claims**



1. Electron microscope comprising:

a bent primary beam path along which are arranged sequentially an electron beam source, a means for generating a substantially constant magnetic deflecting field and a first electron lens, said electron lens having an object plane, a device for holding the surface of a sample substantially in the object plane of said electron lens; a

secondary beam path, along which are arranged in sequence a cathode lens, said magnetic deflecting field, means for detecting secondary electrons returned from said surface of a sample, the electron microscope further comprising a means for generating a substantially constant energy-selective electrostatic deflecting field, said means for generating said electrostatic deflecting field arranged in the primary beam path before the magnetic deflecting field and said electrostatic deflecting field so formed that it deflects the primary beam in a direction which is opposite to the direction of deflection of said magnetic deflecting field thereby compensating for the energy dispersion caused by the magnetic deflection field.

4,978,856

AUTOMATIC FOCUSING APPARATUS

Seishi Akado, Tokyo, Japan, assignor to Jeol Technics Co., Japan

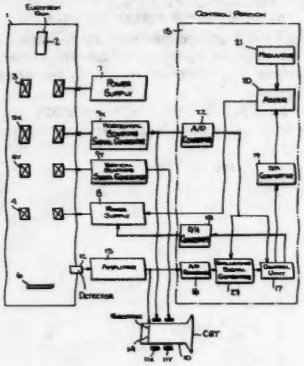
Filed Mar. 31, 1989, Ser. No. 331,651
Claims priority, application Japan, Apr. 1, 1988, 63-80702
Int. Cl.[5] H01J *37/26*
U.S. Cl. 250—310 **16 Claims**

1. An automatic focusing apparatus for a scanning device comprising a focusing lens for focusing an electron beam onto a specimen, a sweeping means for sweeping an excitation current to the focusing lens in accordance with a linearly changing sweep signal, and an evaluating signal-producing means for producing an evaluating signal indicating the degree to which the focusing leans is focused, said automatic focusing apparatus comprising:

modulating means for modulating the linearly swept excitation current with a periodic signal; and

control means for determining plural occurrences when the

evaluating signal assumes local maxima values, wherein said control means calculates an average value of the linearly swept signal for each of the respective occurrences of the local maxima values, and wherein said control means sets the excitation current value to be supplied to the focusing lens in accordance with the average value.



4,978,857

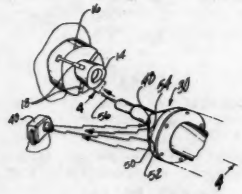
OPTICAL DATA SYSTEM HAVING FLASH/RECEIVER HEAD FOR ENERGIZING/RECEIVING INFORMATION FROM A BATTERY OPERATED TRANSMITTER

Richard O. Juengel, Romeo, Mich., assignor to GTE Valenite Corporation, Troy, Mich.

Division of Ser. No. 27,112, Mar. 13, 1987, Pat. No. 4,779,319, which is a continuation of Ser. No. 504,137, Jun. 14, 1983, abandoned, which is a continuation-in-part of Ser. No. 414,734, Sep. 3, 1982, Pat. No. 4,545,106, and Ser. No. 478,906, Mar. 25, 1983, Pat. No. 4,578,906, said Ser. No. 414,734, and Ser. No. 478,906, each is a continuation-in-part of Ser. No. 259,257, Apr. 30, 1981, Pat. No. 4,401,945. This application Jul. 15, 1988, Ser. No. 219,649

Int. Cl.[5] G02B 27/00

U.S. Cl. 250—551 18 Claims



1. Apparatus for use in a probing system utilized by a machine tool, said apparatus comprising:

a housing containing a light source and a photodetector, said light source including means for transmitting an optical signal to an optical signal receiving means prior to a probing operation, said receiving means including means for applying a turn on signal to a power source for applying power to a transmitter means, said transmitter means sending return optical signals to said photodetector, and means coupled to the photodetector for detecting receipt of the return optical signals containing information relating to the probing operation.

4,978,858

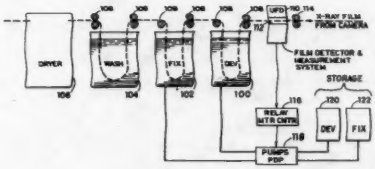
OPTICAL WEB DETECTION AND MEASUREMENT SYSTEM ESPECIALLY ADAPTED FOR CONTROLLING REPLENISHMENT OF X-RAY FILM PROCESSING CHEMICALS

Roger D. Ellsworth; William A. Richards; James T. Samuels, and James K. Bober, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 9, 1989, Ser. No. 364,749

Int. Cl.[5] G01N 21/86

U.S. Cl. 250—560 18 Claims



1. A system which provides for web detection and measurement and which is operable on semi-opaque webs such as x-ray films, which system comprises an array of light-emitting sources disposed in a direction which is across the web, an array of optical detectors in receptive relationship for light from said array of sources, means for presetting the intensity of light from each of said sources to a first level such that the interposition of a web between any of said sources and the detectors in light receiving relationship therewith will reduce the intensity of light incident on that detector below a certain threshold even when said web is semi-opaque, and means operative during web detection operation of said system and responsive to signals from said detectors for incrementally increasing and decreasing said pre-set levels when the level of light received by said detectors is respectively below and above said first level so as to maintain said first level of intensity.

4,978,859

METHOD AND ARRANGEMENT FOR DETERMINING THE SIZE AND/OR THE SHAPE OF A FREELY FALLING OBJECT

Anders Ransheim, Helsingborg, Sweden, assignor to Gedevelop Electronics AB, Helsingborg, Sweden

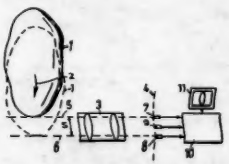
PCT No. PCT/SE88/00204, § 371 Date Nov. 1, 1989, § 102(e) Date Nov. 1, 1989, PCT Pub. No. WO88/08958, PCT Pub. Date Nov. 17, 1988

PCT Filed Apr. 22, 1988, Ser. No. 433,410

Claims priority, application Sweden, May 6, 1987, 8701862

Int. Cl.[5] G01N 21/86

U.S. Cl. 250—560 10 Claims



1. A method of determining the shape and/or the size of a freely, falling object, particularly of a drop of liquid or semi-

liquid material, such as molten glass in particular, characterized by

optically detecting one end of the object (1) at two positions (5, 6) located at a given distance apart in the fall path (2) of the object, and determining the time difference between said two detections;

calculating the speed at which the object falls during movement of said detected end between the two detection locations from said time difference and the distance (s) between the detection locations;

projecting, during the fall of the object past the detection locations, that part of the object which is located between the detection locations at each moment in time onto an elongated array (9) of a large number of mutually adjacent radiation detectors extending transversely to the fall direction of the object;

scanning said array (9) periodically at a given time interval a large number of times during the fall of the object past the array;

preserving information obtained from each scanning of the array relating to the number of detectors in the array which during the scan were covered by the image of the object projected onto the array, and therewith information concerning the width of the object;

calculating from said calculated speed and said given time interval the values of the distance through which the object falls between the different scans of the array (9); and

using the said width values and said fall distances for determining the size of the object.

4,978,860

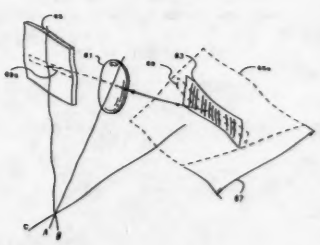
OPTICAL SYSTEM FOR A LARGE DEPTH-OF-FIELD BAR CODE SCANNER

Brian J. Bayley, Palo Alto; Michael J. Brosnan, Fremont, both of Calif., and Neil Hochgraf, Rochester, N.Y., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 21, 1988, Ser. No. 247,216

Int. Cl.[5] G06K 7/10

U.S. Cl. 250—568 21 Claims



1. An optical system for a bar code scanner for reading a bar code tag, comprising:

a focusing means; and

a two dimensional array of detectors positioned on a first surface tilted with respect to the principal plane of the focusing means, so that images of the detectors are formed on a second surface intersecting the bar code tag, and an image of the bar code tag is formed intersecting the first surface, with a portion of the image of the bar code tag substantially in focus on at least one of the detectors.

4,978,861

DEVICE FOR THE CONTINUOUS DETERMINATION OF A SURFACE STATE INDEX FOR A MOVING CREPED SHEET

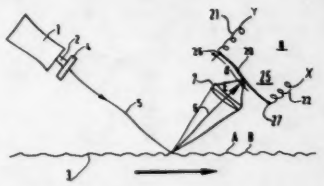
Jacques Sabater, Gif sur Yvette; Jean C. Kerneis, Saint Egreve, and Serge Bauduin, La Tronche, all of France, assignors to Centre Technique de l'Industrie des Papiers, Cartons et Celluloses, France

PCT No. PCT/FR88/00448, § 371 Date Apr. 19, 1989, § 102(e) Date Apr. 19, 1989, PCT Pub. No. WO89/02573, PCT Pub. Date Mar. 23, 1989

PCT Filed Sep. 13, 1988, Ser. No. 359,745

Int. Cl.[5] G01N 21/86

U.S. Cl. 250—571 9 Claims



1. A device for continuously determining a surface state index of a moving sheet which is creped in the form of undulations, the device comprising:

a laser source which emits a beam toward a surface of the moving sheet;

a first astigmatic optical system positioned between said laser source and the moving sheet for concentrating said beam emitted by said laser source to form a luminous spot at an area of the moving sheet to be analyzed, said first optical system transforming a shape of said beam emitted by said laser source such that said luminous spot is adapted to the direction and dimension of average pitch of the undulations;

a second, convergent optical system disposed on the same side of the moving sheet as said first optical system for concentrating light which has been back-scattered by the moving sheet;

an optoelectronic cell for receiving said concentrated light from said second optical system at a sensitive surface thereof, said optoelectronic cell producing electrical signals responsive to an impacting position of said concentrated light on said sensitive surface; and

a processing system comprising means for determining the surface state index of the moving sheet using said electrical signals.

4,978,862

METHOD AND APPARATUS FOR NONDESTRUCTIVELY MEASURING MICRO DEFECTS IN MATERIALS

Robert M. Silva, deceased, late of Dayton, Ohio (by Ruby M. Silva, executrix); Fred D. Orazio, Jr., Centerville, and Robert B. Sledge, Jr., Dayton, both of Ohio, assignors to VTI, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 301,721, Jan. 26, 1989, Pat. No. 4,933,567, which is a continuation-in-part of Ser. No. 218,542, Jul. 13, 1988, abandoned, which is a continuation-in-part of Ser. No. 918,518, Oct. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 724,966, Apr. 19, 1985, abandoned. This application Nov. 16, 1989, Ser. No. 437,109

The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.

Int. Cl.[5] G01N 21/01

U.S. Cl. 250—572 7 Claims

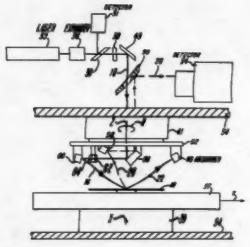
1. A method of measuring the distribution of micro defects on a predetermined area of a material, comprising the steps of:

(a) generating a beam of electromagnetic radiation;

(b) directing the beam towards the surface at a predetermined fixed angle of incidence and focusing the beam to expose a small portion of the material to the electromagnetic radiation;

(c) directing a detector's line of sight toward the surface of the material to the point where the beam intercepts the surface;

(d) limiting the extent of the scattered electromagnetic radiation entering the detector in order to detect the scatter coming from a small solid angle around the line of sight for detecting a portion of the scattered electromagnetic radiation and converting it to an electrical signal proportional to the detected intensity;



(e) producing relative rotation between the beam and the material about an axis substantially perpendicular to the surface and at the point where the beam intercepts the surface and determining the rotational position of selected maximum scatter for that point;

(f) producing relative lateral movement between the beam and the material to expose an adjacent portion of the material to the electromagnetic radiation;

(g) repeating above steps (e) and (f) for each portion of the material exposed until the predetermined area is covered in a contiguous manner; and

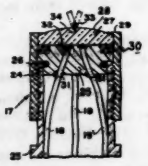
(h) mapping the selected maximum scatter intensity versus the coordinate position of each point of measurement for the predetermined area.

4,978,863

METHOD AND APPARATUS FOR FIBER OPTIC BACKSCATTERED LIGHT MEASUREMENT TO DETERMINE FLOW RATES OF MULTI-PHASE STREAMS

John W. Lyons; John A. Roper, III, both of Midland, Mich., and Peter D. Aldrich, Miami, Fla., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 6, 1988, Ser. No. 240,860
Int. Cl.[5] G01N 15/06
U.S. Cl. 250—574 14 Claims



1. A method of determining flow rates in a fluid medium containing particles capable of backscattering light, said method comprising:

(a) illuminating a single, finite and symmetrical zone of said medium with light capable of being backscattered by said particles;

(b) collecting backscattered light from said zone;

(c) converting said backscattered light into voltage waveforms; and

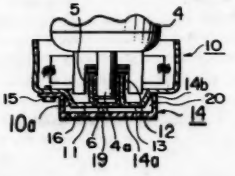
(d) determining flow rates by autocorrelation of the bandwidths of said waveforms at discrete points in time.

4,978,864

MOISTURE DRAIN ARRANGEMENT FOR A VERTICAL SHAFT ENGINE STARTER

Masakatsu Ida, and Arkira Morishita, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,802
Claims priority, application Japan, Jul. 6, 1988, 63-89795[U]
Int. Cl.[5] F02N 11/10
U.S. Cl. 290—48 4 Claims



1. A moisture drain arrangement for a vertical shaft engine starter, comprising:

a substantially cup-shaped rear bracket disposed at the lower end of the starter and including a bottom wall having a water drain hole; and

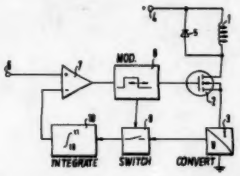
shielding means disposed spaced apart from said bottom wall of said rear bracket but substantially directly below said drain hole for defining a substantially winding water draining passage.

4,978,865

CIRCUIT FOR REGULATING A PULSATING CURRENT

Ralf Hartmann, Kelkheim, and Jürgen Raus, Freigericht, both of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 20, 1989, Ser. No. 341,147
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824526
Int. Cl.[3] H01H 47/32
U.S. Cl. 307—140 4 Claims



1. A regulating circuit for regulating a pulsating current in an inductor, in particular the coil of an electromagnetic valve, the circuit comprising

the inductor and a diode connected in parallel combination

a semiconductor switch connected in series with the parallel combination of diode and inductor, the diode serving as a free-running diode;

a pulse-width modulator, and a controller having an output connected by the modulator to a control input of the

switch, there being a desired-value voltage to be fed to the controller;

a current-voltage transformer; and wherein

an actual-value voltage drop proportional to the current measurable during a state of conduction in the semiconductor switch is derivable by means of the current voltage transformer, the transformer being connected in series with the inductor and the semiconductor switch; and wherein

the circuit further comprises

another switch and an integrator, said another switch being controlled by the pulse width modulator for performing a gating of the voltage drop proportional to the current measure as to time, and the integrator connecting to said another switch for performing the integration of the voltage drop proportional to the current measure.

4,978,866

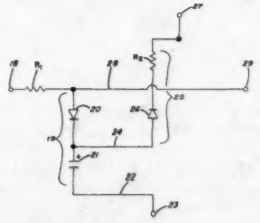
RAMP CIRCUIT FOR CONTROL LOOP

John J. Kuhn, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 1, 1988, Ser. No. 214,367

Int. Cl.[5] H03K 4/08, 5/01; H03B 1/09

U.S. Cl. 307—228 24 Claims



1. In a process control loop having a controller to compare an actual value of a monitored variable to a predetermined set point value for that variable and a controllable means, THE IMPROVEMENT COMPRISING:

a ramp circuit having an input for receiving a controller output signal from the controller in the control loop and an output for sending a ramp circuit output signal to the controllable means to limit the slew rate of the controller output signal and having a storage means with a capacitor to develop a potential in response to receiving the controller output signal from the controller, and having a reset means connected to the storage means to provide a discharge path for said capacitor in the event of a decrease in power to the control loop.

4,978,867

INTEGRATED CIRCUIT WITH ON-CHIP VOLTAGE CONVERTER

Leonardus C. M. G. Pfennings, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

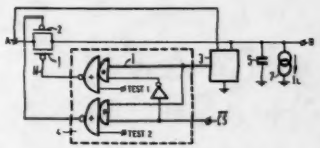
Continuation of Ser. No. 171,994, Mar. 23, 1988, abandoned. This application Dec. 1, 1989, Ser. No. 445,896

Claims priority, application Netherlands, Jun. 24, 1987, 8701472

Int. Cl.[5] H03K 3/01, 17/56; G05F 1/40

U.S. Cl. 307—296.6 2 Claims

1. An integrated circuit comprising an external and an internal supply terminal and a voltage converter which is connected between said terminals in order to apply a voltage to the internal supply terminal which is lower than that present on the external supply terminal, and a parasitic integrated circuit capacitance present at said internal supply terminal, characterized in that the voltage converter comprises means for repeatedly charging the parasitic integrated circuit capacitance to a desired voltage, said means comprising a first electronic switch having a control input and which is connected between said terminals and also comprises a detector, an input of said detector being connected to the internal supply terminal and an ouput of said detector being coupled to the control input of the electronic switch in order to set the state of the switch depending on the voltage on the internal supply terminal, a second electronic switch being arranged in parallel with said first electronic switch, which second switch is proportioned for



smaller currents, the integrated circuit comprising a logic circuit, a first input of which is connected to the output of the detector and a second input of which receives an integrated circuit selection signal during operation, a first and a second output thereof being connected to the control input of the first and the second electronic switch, respectively, in order to conduct the output signal of the detector to one of the first and the second output of the logic circuit, depending on the logic state of the integrated circuit selection signal.

4,978,868

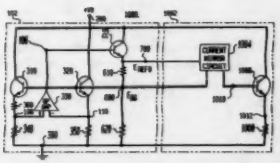
SIMPLIFIED TRANSISTOR BASE CURRENT COMPENSATION CIRCUITRY

Raymond L. Giordano, Flemington, and Salomon Vulih, Neshanic Station, both of N.J., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 7, 1989, Ser. No. 390,147

Int. Cl.[5] H03K 3/01, 3/26

U.S. Cl. 307—296.600 31 Claims



1. Circuitry coupled to a voltage reference generator circuit having a reference voltage output terminal and including a first bipolar transistor having a base, said circuitry comprising:

a current mirror circuit having an input and first and second outputs;

a second bipolar transistor being of the same conductivity type as the first transistor and having a base and a first output;

the input of the current mirror circuit coupled to the reference voltage output terminal of the voltage reference generator circuit;

the first output of the current mirror circuit being coupled to the base of the first transistor;

the second output of the current mirror circuit being coupled to the base of the second transistor; and

a first resistor having a first terminal coupled to the first output of the second transistor.

4,978,869

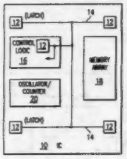
ESD RESISTANT LATCH CIRCUIT

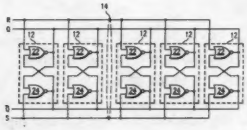
Donald R. Dias, Carrollton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Continuation of Ser. No. 163,280, Mar. 2, 1988, abandoned. This application Apr. 19, 1990, Ser. No. 511,874

Int. Cl.[5] H03K *17/16, 3/26*

U.S. Cl. 307—443 **23 Claims**





1. A latch circuit comprising:

a plurality of bistable multivibrator circuits,

operatively connected to always have a shared instantaneous logic state during times when the circuit is in a stable non-transient condition,

each said multivibrator circuit having a respective input terminal;

each said multivibrator circuit having a respective output terminal;

wherein multiple ones of said bistable multivibrator circuits are located in respective mutually remote locations including at least two different corners of a common integrated circuit chip;

wherein all of said input terminals are coupled together;

wherein all of said output terminals are coupled together.

4,978,870

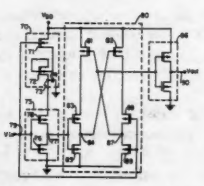
CMOS DIGITAL LEVEL SHIFTER CIRCUIT

Ming-Daw Chen, and Nang-Ping Tu, both of Hsin Chu, Taiwan, assignors to Industrial Technology Research Institute, Taiwan

Filed Jul. 19, 1989, Ser. No. 382,136

Int. Cl.[5] H03K *19/094, 19/0175, 3/284*

U.S. Cl. 307—475 **12 Claims**



1. In a digital level shifting circuit having a single voltage supply and inverter means for inverting an input signal characterized by a first peak voltage level to produce therefrom an inserted signal, the improvement comprising:

voltage generator circuit means energized by said voltage supply for providing an internally generated supply voltage to said input inverter means, and

latch means energized by said voltage supply and having tow branches, each of said branches having transistor means, each transistor means having a commonly connected drain and a commonly connected gate, the commonly connected gate of one of said transistor means being connected to receive said inverted signal, said transistor means in each of said branches comprising a complementary transistor pair comprising an NMOS transistor and a PMOS transistor, the commonly connected gate of the other one of said transistor means being connected to receive said input signal, whereby at the commonly connected drain of the other transistor means is produced a shifted voltage characterized by a second peak voltage level corresponding to the voltage of said voltage supply.

4,978,871

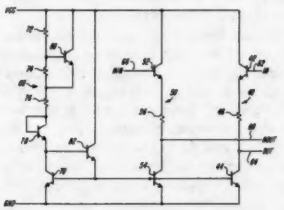
LEVEL SHIFT CIRCUIT FOR CONVERTING A SIGNAL REFERENCED TO A POSITIVE VOLTAGE TO A SIGNAL REFERENCED TO A LOWER VOLTAGE

E. Perry Jordan, Greensboro, N.C., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Aug. 31, 1989, Ser. No. 401,065

Int. Cl.[5] H03K *19/082, 19/092*

U.S. Cl. 307—475 **23 Claims**



1. A level shift circuit for converting a first signal referenced to a first voltage to a second signal referenced to a second voltage lower than the first voltage, said circuit comprising:

a first transistor having a base for receiving the first signal and a collector connected to the first voltage;

a second transistor having an emitter coupled to the second voltage;

a level shift resistor having a first terminal coupled to an emitter of the first transistor and a second terminal coupled to a collector of the second transistor, the second signal being supplied from the second terminal of said level shift resistor; and

reference current means for causing a substantially constant current to be drawn through said first and second transistors and said level shift resistor, said reference current means including a reference transistor having a base connected to a base of said second transistor and an emitter connected to the second voltage.

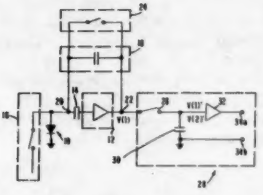
4,978,872
INTEGRATING CAPACTIVELY COUPLED TRANSIMPEDANCE AMPLIFIER

Arthur L. Morse, Hawthorne; Steve D. Gaalema, Encinitas; Ingrid M. Keimel, Fountain Valley, and Mary J. Hewitt, Playa Del Rey, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 241,722, Sep. 8, 1988, abandoned, which is a division of Ser. No. 682,112, Dec. 17, 1984, Pat. No. 4,786,831. This application Nov. 20, 1989, Ser. No. 437,787

Int. Cl.[5] G06G 7/12; H03K 5/159, 5/00; G01J 5/00

U.S. Cl. 307—490 16 Claims



1. An integrating amplifier for a radiation detector comprising:

means for integrating during an integration period a photon induced current generated by a radiation detector, said integrating means comprising amplifier means having an input node coupled to said radiation detector, said amplifier means also having an output node;

means for biasing said radiation detector to a predetermined bias voltage potential, said biasing means being switchably coupled to said radiation detector through a detector bias switch means;

an integrating capacitor coupled across said amplifier means between said input and said output nodes thereof; and

integrating capacitor reset means coupled in parallel with said integrating capacitor and across said amplifier means between said input and said output nodes thereof for resetting

said integrating capacitor at the end of said integration period;

said integrating capacitor integrating said detector current during said integration period, and wherein

said radiation detector, said amplifier means, said biasing means, said integrating capacitor and said integrating capacitor reset means are each fabricated upon a common integrated circuit structure.

4,978,873
CMOS ANALOG FOUR-QUADRANT MULTIPLIER

Patrick A. Shoemaker, Lemon Grove, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 11, 1989, Ser. No. 421,495

Int. Cl.[5] H03L 5/00; H03K 19/01

U.S. Cl. 307—498 20 Claims

1. A four quadrant multiplier circuit for providing an output which is proportional to a multiplication product of input voltages V_1 and V_2, comprising:

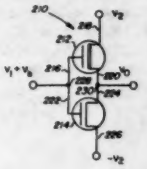
an n-channel field effect transistor having a first gate, first and second terminals, threshold voltage V_{tn}, and a gain constant K_n; and

a p-channel field effect transistor having a second gate, third and fourth terminals, threshold voltage V_{tp}, where $V_{tp}-V_{tn}>0$, and a gain constant K_p substantially equal to K_n; where

said input voltage V_2 is applied to said first terminal and an input voltage $-V_2$ is applied to said fourth terminal, such that

when said input $V_2>0$, said second and third terminals are sources of said n- and p- channel transistors and said first and fourth terminals are drains of said n- and p-channel transistors; and

when said input $V_2<0$, said second and third terminals are drains of said n- and p-channel transistors, and said first and fourth terminals are sources of said n- and p-channel transistors;



said first and second gates are electrically coupled in common to form a common gate, said common gate receiving a voltage which is the sum of said input voltage V_1 and a bias voltage, V_b, where V_b is substantially equal to $(V_{tp}+V_{tn})/2$;

said second terminal is electrically coupled to said third terminal to provide an output terminal; and

$|V_1|$ and $|V_2|$ are limited such that said n- and p- channel transistors are operated in their respective triode regions.

4,978,874
COAXIAL TYPE ENGINE STARTER WITH HOLLOW ARMATURE SHAFT

Shuzoo Isozumi; Tetsuo Yagi, and Toshinori Tanaka, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

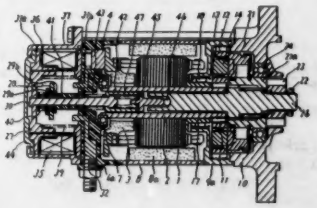
PCT No. PCT/JP87/00792, § 371 Date Aug. 15, 1988, § 102(e) Date Aug. 15, 1988, PCT Pub. No. WO88/02946, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 16, 1987, Ser. No. 249,174

The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.

Int. Cl.[5] H02K 7/10

U.S. Cl. 310—83 16 Claims



1. An engine starter comprising: a motor having a tubular armature rotation shaft; a rotation output shaft coaxial with said armature rotation shaft at one end of said motor and held to be slidable in the axial direction; a clutch mechanism for transmitting the turning force of said armature rotation shaft to said rotation output shaft; and an electromagnetic switch installed on an axially opposite end of said motor, said switch having a shifting member for slidably moving said rotation output shaft in said axial direction and for engaging a movable contact with a fixed contact by means of said electromagnetic force, thereby to supply power to said motor; wherein a rear part of said rotation output shaft and a front part of said shifting member are positioned within said tubular armature rotation shaft; said shifting member comprising, a sleeve for push-

ing said rotation output shaft, a spring for pressing said sleeve, a bushing which receives reaction of said spring and said movable contact; wherein a minute clearance is provided between an outer circumference of said bushing and an internal circumferential surface of an insulator on which said fixed contact is disposed.

4,978,875

DRAINING DEVICE FOR A STARTER

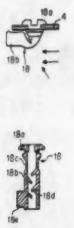
Kyoichi Okamoto, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1989, Ser. No. 427,222

Claims priority, application Japan, Nov. 26, 1988, 63-154021[U]

Int. Cl.[5] H02K *5/22*

U.S. Cl. 310—88 **6 Claims**



1. A water draining device for a vehicle starter motor, comprising:

a head portion (**18***a*) adapted to be attached to a housing member of the starter motor,

an elongate tubular body (**18***b*) having an inner circumferential surface defining a labyrinth structure, made of an elastic material, and depending downwardly from the head portion; and

deformation means embodied in the tubular body at an upper, root portion thereof proximate the head portion to render said root portion more deformable than portions of the tubular member at any other position, such that external splash water or the like impacting laterally against the tubular body causes the tubular body to bend at said root portion and thereby prevent the entry of such water into the housing member via the tubular body.

4,978,876

CUP-SHAPED SUPPORT FOR AN ELECTROMOTOR

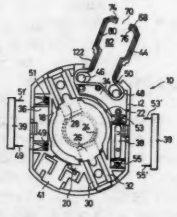
Walter Koster, Ganderkesee, Fed. Rep. of Germany, assignor to Schunk Motorensysteme GmbH, Ganderkesee, Fed. Rep. of Germany

Filed Mar. 31, 1989, Ser. No. 330,904

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3810961

Int. Cl.[5] H02K *15/06, 13/00*

U.S. Cl. 310—239 **10 Claims**



1. A cup-shaped support made of plastic designed for an electromotor like a permanent magnet-excited motor for an electric tool or a sash lifter for lodging carbon brushes and electrical and electronic elements, being connected over connection lugs to conductor paths, where said carbon brushes and said elements cooperate with the commutator of the motor, and where said conductor paths are sections of a grid made of sheet material arranged at the bottom of the support, where

said support has sectionally a double-walled configuration for forming housing chambers for the elements,

said housing chambers have openings extending in the direction of said grid,

said openings being guides for said connection lugs,

said support can be locked at least sectionally by means of a cover element on the side opposite to said grid,

said cover element has a flat seal on the outer surface,

and where said support is completely arranged in a first housing part,

the said first housing part is connected with the second housing part in the area of said cover element, and said first housing part is sealed by means of a flat seal from the second housing part.

4,978,877

MOUNTING DEVICE FOR BRUSHES IN A REVERSIBLE COMMUTATOR MOTOR

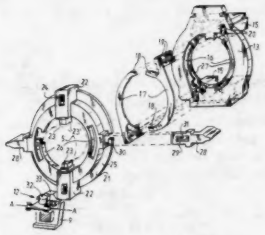
A. J. J. Quirijnen, Molenschot, Netherlands, assignor to Emerson Electric Co., Konijnenberg, Netherlands

Filed Feb. 15, 1989, Ser. No. 311,323

Claims priority, application Netherlands, Feb. 15, 1988, 8800366

Int. Cl.[5] H02K *13/00*

U.S. Cl. 310—239 **4 Claims**



1. A device for mounting at least one pair of brush holders with brushes located diametrically opposite one another about a motor shaft of a reversible commutator motor for an electric hand tool, the motor including a field coil, the device including:

an annular carrier for said brush holders rotatable concentrically around the motor shaft; and

a stationary contact plate connected to each field coil, whereby said contact plate is provided with two mutually separated contact strips and the annular carrier has a chamber open on one side for accommodating at least one of said brush holders with a brush, which open side faces towards one of the contact strips, wherein each contact strip is provided with a plug and said contact plate is provided with a socket for contacting the field coil, and the chamber has a closed outer wall and two parallel side walls situated in an axially located plane.

4,978,878

ELECTRIC MULTIPOLAR MACHINE

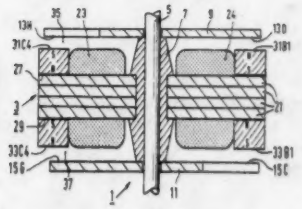
Reinder H. Dijken, Groningen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 19, 1989, Ser. No. 368,488

Claims priority, application Netherlands, Jun. 27, 1988, 8801629

Int. Cl.[5] H02K *1/22*

U.S. Cl. 310—268 5 Claims



1. Electric multipolar machine of the electromagnetic type, comprising:

a first machine part with a magnetically soft first element,

a second machine part arranged coaxially relative to the first machine part, with a magnetically soft second element, provided with at least three teeth and with active coils,

permanent magnets arranged in a circular path and ending in pole faces which mate with tooth faces across an air gap, said pole faces and tooth faces being characterized by corresponding tangential dimensions, and

a machine shaft about which the abovementioned machine parts are rotatable relative to each other, characterized in that the first element of the first machine part has two parallel toothed magnetically soft disc-shaped plates, which are each provided with said tooth faces uniformly distributed over the periphery of the plate, the magnets are disposed on the teeth of the second machine part and are located between the two disc-shaped plates, and pole faces being arranged in groups, with at least three groups, spatially separated from each other, each of at least two magnets being present, while the number of groups of magnets is equal to the number of active coils, and adjacent pole faces in each of the abovementioned groups have an opposite polarity, and the centre-to-centre distance of two successive tooth faces, measured along a circular arc situated near the tooth faces, is at least nearly twice the centre-to-centre distance measured along the same circular arc between two neighbouring pole faces in each of the abovementioned groups, while the tangential dimension of the tooth faces is smaller than or equal to the corresponding dimension of the pole faces.

4,978,879

ACOUSTIC SURFACE WAVE ELEMENT

Kiyoshi Satoh; Yoshiro Fujiwara, and Kazushi Hashimoto, all of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 25, 1989, Ser. No. 384,829

Claims priority, application Japan, Jul. 27, 1988, 63-187704; Jul. 27, 1988, 63-187705; Oct. 26, 1988, 63-270275; Nov. 1, 1988, 63-276761

Int. Cl.[5] H01L *41/08*

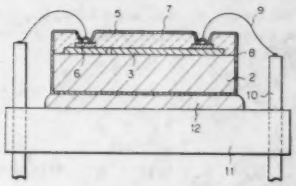
U.S. Cl. 310—313 A 9 Claims

1. An acoustic surface wave element, comprising:

a substrate of a 36° rotated, Y-cut single crystal lithium tantalate having X, Y and Z crystal axes and a top surface and side walls;

electrodes formed on the top surface of the substrate such that an acoustic surface wave is propagated in a direction of the X-axis of the substrate and an oscillation of the acoustic surface wave occurs at a predetermined frequency, the electrodes having a thickness in a range of from 1 to 4% of the wavelength of the acoustic surface wave at the predetermined frequency of oscillation; and

a plasma CVD-deposited layer of silicon dioxide covering the electrodes and the substrate, the silicon dioxide layer



having a refractive index in a range of from 1.445 to 1.486 and a thickness in a range of from 16 to 26% of the wavelength of the acoustic surface wave at the predetermined frequency of oscillation.

4,978,880

PIEZOELECTRIC CAPSULE WITH FLAT SUPPORTING SURFACE AND RESILIENT HOLDING MEANS

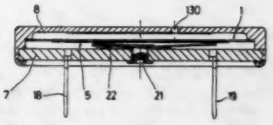
Pierre Causse, Dole; Peter Graham, Bonneville; Bernard Maury, Bonneville, and Jean-Claude Walter, Bonneville, all of France, assignors to Horlogerie Photographique Francaise Societe Anonyme, Bonneville, France

Filed Feb. 23, 1990, Ser. No. 484,383

Claims priority, application France, Feb. 27, 1989, 89 02931

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—324 15 Claims



1. An electroacoustic capsule with piezoelectric membrane, in which :

the membrane is formed of a thin disk on to which is fixed a piezoelectric ceramic layer, covering the central zone of the disk, both faces of which are metallized and form respectively an internal electrode and an external electrode;

the membrane is housed in a case formed of a base body and a lid fitted together along a closed periphery, the base body comprising a first wall substantially parallel to the disk with which it forms a rear acoustic cavity, the lid comprising a second wall substantially parallel to the disk with which it forms a front acoustic cavity;

case comprises a front peripheral step against which the periphery of the disk is held applied by resilient holding means;

a first and a second electric connection terminals are insulated electrically and mounted on the base body

said first electric connection terminal is connected electrically to said internal electrode by first electric connection means;

said second electric connection terminal is connected electrically to said external electrode by second electric connection means;

wherein :

said thin disk comprises a peripheral portion of its front face with a substantially flat shape, forming a zone of contact with the front peripheral step;

said front peripheral step comprises a precise circular sup-

porting surface defining a continuous flat surface for contact with said disk, the inherent flatness being provided with a tolerance less than or equal to 0.03 mm;

the resilient holding means bear on the intermediate zone of the rear face of the membrane; so that the inherent flatness of the contacting surfaces of said front peripheral step and said thin disk urged one against the other provide sealing between the front acoustic cavity and the rear acoustic cavity.

4,978,881

PIEZOELECTRIC ACTUATOR OF LAMINATION TYPE

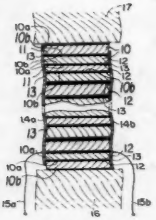
Naomasa Wakita, Nagoya; Hideharu Aoki, Ichinomiya, and Makoto Okuda, Nagoya, all of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Jul. 18, 1989, Ser. No. 381,285

Claims priority, application Japan, Aug. 20, 1988, 63-95959

Int. Cl.[5] H01L 41/08

U.S. Cl. 310—328 **6 Claims**



1. A piezoelectric actuator of a lamination type comprising a sintered lamination body of a plurality of sheet-like electrostrictive elements having opposite lateral edges, electrode layers each provided on at least one of the major surfaces of said each electrostrictive element, each electrode layer having one end extended to one lateral edge of said respective electrostrictive elements and the other end thereof terminated inwardly from the opposite lateral edge of said respective electrostrictive elements to define an insulating zone, insulating gaps each provided between said adjacent electrostrictive elements by said respective insulating zones and disposed alternately adjacent opposite lateral edges of said plurality of electrostrictive elements, each of said insulating gaps being filled with elastic material for absorbing and reducing any internal stress produced in said respective insulating zone, and a pair of external negative and positive electrodes positioned respectively on said opposite lateral edges, and being respectively and commonly connected to the said one ends of said electrode layers exposed on the respective lateral edges of alternate said electrostrictive elements.

4,978,882

VIBRATION WAVE DRIVEN MOTOR

Koji Kitani, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

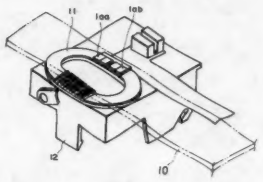
Filed Apr. 25, 1990, Ser. No. 514,411

Claims priority, application Japan, Apr. 25, 1989, 1-105508

Int. Cl.[5] H01L 41/08

U.S. Cl. 310—328 **10 Claims**

1. A vibration wave driven motor in which a vibration member and a member brought into pressure contact with said vibration member are frictionally driven relative to each other through a sliding material secured to the sliding surface of one of them, characterized in that said sliding material is a compound resin material comprising fluorine resin as a matrix



material, and thermosetting resin or thermoplastic resin having a higher melting point than said fluorine resin.

4,978,883

VIBRATION DETECTING DEVICE

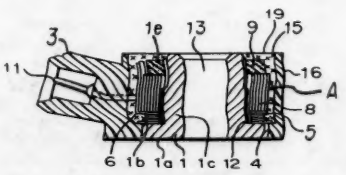
Satoshi Komurasaki, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 411,290

Claims priority, application Japan, Oct. 12, 1988, 63-254762; Apr. 18, 1989, 64-96224

Int. Cl.[5] H01L 41/08

U.S. Cl. 310—329 **2 Claims**



1. A vibration detecting device, comprising:

a metal bush having a central cylindrical portion;

a generally cylindrical casing of resinous material formed by injection-molding and surrounding said central cylindrical portion of the bush to define therewith an annular cavity open at an upper end and closed at a bottom end by a flange of the bush;

a piezoelectric element, a terminal and a weight disposed around an outer periphery of said central cylindrical portion of the bush within said cavity;

a nut fastened to said central cylindrical portion to secure said piezoelectric element, said terminal and said weight in place, and

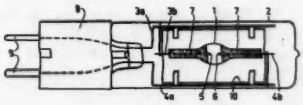
a filler for sealing said nut, said piezoelectric element, said terminal and said weight in said cavity, wherein said filler comprises a first filler of gel-like silicone resin surrounding outer portions of said piezoelectric element, said terminal and said weight and a second filler overlying said first filler and closing the open upper end of the cavity, said second filler being harder than said first filler.

4,978,884

METAL HALIDE DISCHARGE LAMP HAVING LOW COLOR TEMPERATURE AND IMPROVED COLOR RENDITION

Johannes A. J. M. Van Vliet, and Hendrik A. Van Esveld, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation

Filed Apr. 12, 1989, Ser. No. 337,023
Claims priority, application Netherlands, May 19, 1988, 8801290
Int. Cl.[5] H01J 61/20, 61/34
U.S. Cl. 313—25 6 Claims



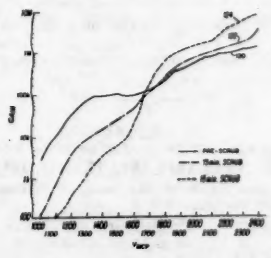
1. A high-pressure metal halide discharge lamp comprising a sealed outer envelope, a translucent discharge vessel within said outer envelope sealed in a gas-tight manner and having discharge electrodes arranged therein, current conductors extending through said outer envelope to said electrodes, and an ionizable filling in the discharge vessel comprising mercury, a rare gas, dysprosium halide and a second metal halide, characterized in that:
said second metal halide is selected from the group consisting of halides of Tl, Ce, Pr, Nd, Sm and Gd,
the metal mass of the dysprosium halide is approximately 1.5 to approximately 8 mg per ml of volume of the discharge vessel and is at least approximately 10% of the metal mass of mercury, and
the quantity of said second metal halide is 0 to 0.015 mmol/ml of volume of the discharge vessel.

4,978,885

ELECTRON MULTIPLIERS WITH REDUCED ION FEEDBACK

Paul L. White, Sturbridge, and Bruce N. Laprade, Holland, both of Mass., assignors to Galileo Electro-Optics Corporation, Sturbridge, Mass.

Filed Mar. 2, 1989, Ser. No. 317,977
Int. Cl.[5] H01J 40/00
U.S. Cl. 313—103 CM 43 Claims



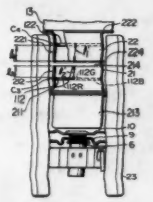
1. An electrical device comprising:
an electron multiplier having been scrubbed by the impact of particles thereon resulting from operating the EM at an applied voltage sufficient to result in the onset of self-sustained ion regeneration for a time sufficient to result in an effective termination of the self-sustained ion regeneration such that thereafter ion feedback is negligible when the EM is operated up to said applied voltage.

4,978,886

ELECTRON GUN FOR USE IN COLOR CATHODE RAY TUBE HAVING A PLURALITY OF GRID ELECTRODES

Satoru Miyamoto, Mobara; Yoshiaki Takahashi, Chiba; Katsuyuki Shirai, Mobara; Ikuya Takahara, Mobara, and Satoru Endo, Mobara, all of Japan, assignors to Hitachi, Ltd. and Hitachi Device Engineering Co., Ltd., both of Chiba, Japan

Filed Jun. 16, 1988, Ser. No. 207,524
Claims priority, application Japan, Jun. 17, 1987, 62-149019
Int. Cl.[5] H01J 29/62, 29/82
U.S. Cl. 313—414 5 Claims



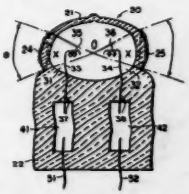
1. An electron gun, wherein the at least one of the plurality of grid electrodes serves as a main lens of the electron gun and a center of an elliptical aperture of the at least one inner electrode coincides with a center of an inner all of at least one of the cylindrical electrodes of the at least one of the plurality of grid electrodes, and an outer surface of the at least one inner electrode is tightly engaged with an inner surface of the inner wall of the at least one of the cylindrical electrodes, thereby enabling removal of astigmatism in the main lens and improving resolution of the color cathode ray tube, wherein the at least one of the plurality of grid electrodes serves as a main lens of the electron gun and a center of an elliptical aperture of the at least one inner electrode coincides with a center of an inner wall of at least one of the cylindrical electrodes of the at least one of the plurality of grid electrodes, and an outer surface of the at least one inner electrode is tightly engaged with an inner surface of the inner wall of the at least one of the cylindrical electrodes, thereby enabling removal of astigmatism in the main lens and improving resolution of the color cathode ray tube.

4,978,887

SINGLE ENDED METAL VAPOR DISCHARGE LAMP WITH INSULATING FILM

Atsushi Matsuura; Kazuo Honda; Shinji Inukai, and Hisanori Sano, all of Kanagawa, Japan, assignors to Toshiba Lighting & Technology Corporation, Yokosuka, Japan

Filed Feb. 23, 1989, Ser. No. 314,104
Claims priority, application Japan, Feb. 26, 1988, 63-42253
Int. Cl.[5] H01J 61/35
U.S. Cl. 313—635 4 Claims



1. A metal vapor discharge lamp comprising:

an envelope formed of a vitreous high temperature resistant material;

a pair of electrodes each having an arc supporting electrode, each of said electrodes being sealed at one end of said envelope;

a charge filling said envelope; and

at least one insulating film formed on said envelope behind at least one of said arc supporting electrodes to increase the vapor pressure of said charge and to improve output and spectral color distribution, said at least one insulating film covering an area defined by a conical angle of 10°–30°, the apex of which is the center of said envelope.

4,978,888

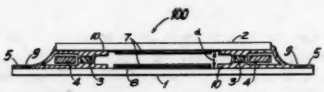
THICK-FILM INTEGRATED FLAT FLUORESCENT LAMP

Muniasamy Anandan, Wayne, and Douglas Ketchum, Rockaway, both of N.J., assignors to Thomas Electronics Incorporated, Wayne, N.J.

Filed Jul. 18, 1989, Ser. No. 381,503

Int. Cl.[5] H01J 63/02

U.S. Cl. 315—58 **14 Claims**



1. An improved electrode structure for a flat fluorescent lamp, said electrode structure comprising:

a first plurality of N thick-film conductors arranged in two groups of N/2 first substrate conductors arranged one group on each edge of a first substrate;

a second plurality of N thick-film conductors arranged in two groups of N/2 second substrate conductors arranged one group on each edge of a second substrate;

said two groups of N/2 first substrate conductors and said two groups of N/2 second substrate conductors being located on their respective substrates so as to be substantially in alignment; and

a plurality of N spacers having an electrically conductive outer surface, one of each of said plurality of N spacers being sandwiched between each one of the first plurality of N thick-film conductors and one of the second plurality of N thick-film conductors in order to form two groups of N/2 split hollow electrodes.

4,978,889

PLASMA WAVE TUBE AND METHOD

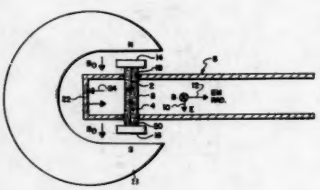
Robert W. Schumacher, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 14, 1988, Ser. No. 181,300

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.[5] H01J 7/24, 25/00

U.S. Cl. 315—111.21 **21 Claims**



1. A plasma wave tube, comprising:

a waveguide housing,

means for confining an ionizable gas within said housing, electron beam generating means mounted on opposed walls of the waveguide housing for generating a pair of counterpropagating electron beams through the gas confined within the housing at a voltage relative to the waveguide housing of at least about 4 kV, thereby forming a pair of electrostatic plasma waves which are mutually coupled into a waveguide mode to emit electromagnetic radiation within the waveguide,

means for establishing a magnetic field within the waveguide to confine the plasma established by the electron beams and maintain the beam impedance high enough to sustain said beam voltage, and

an output means at an end of the waveguide housing for coupling the electromagnetic radiation out of the waveguide housing in a direction along the length of the waveguide.

4,978,890

FLUORESCENT LAMP DEVICE

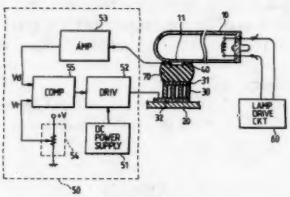
Hiroshi Sekiguchi, Iruma; Atsushi Sekine, Fuchu, and Mitsuaki Ohmiya, Ome, all of Japan, assignors to Japan Aviation Electronics Industry Limited, Japan

Filed Jun. 6, 1989, Ser. No. 362,131

Claims priority, application Japan, Jul. 4, 1988, 63-167269

Int. Cl.[5] H01J 7/24; H05B 31/24

U.S. Cl. 315—117 **4 Claims**



1. A fluorescent lamp device comprising:

a fluorescent lamp;

a Peltier element thermally coupled with said fluorescent lamp on the cold side thereof, for forcibly providing the coldest point in a portion of said fluorescent lamp;

a temperature sensor disposed adjacent said fluorescent lamp at said portion where said coldest point is provided, for detecting the temperature of said portion; and

a drive control circuit for controlling the driving of said Peltier element so that the temperature of said portion where said coldest point is provided becomes lower than a predetermined temperature.

4,978,891

ELECTRODELESS LAMP SYSTEM WITH CONTROLLABLE SPECTRAL OUTPUT

Michael G. Ury, Bethesda, Md., assignor to Fusion Systems Corporation, Rockville, Md.

Filed Apr. 17, 1989, Ser. No. 344,863

Int. Cl.[5] H05B 41/24; H01J 15/04

U.S. Cl. 315—117 **20 Claims**

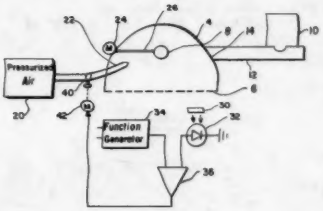
1. In an electrodeless lamp system, a method of controlling the spectral distribution of the lamp output, comprising,

providing an electrodeless lamp having a bulb which contains a fill which includes a substance which emits radiation in a characteristic region of the spectrum and which is not fully vaporized at the lamp operating temperature,

impinging an amount of cooling gas on said bulb during operation which will cause said bulb to operate at such lamp operating temperature,

detecting the magnitude value of the spectral output of the lamp in said characteristic region of the spectrum and generating a comparison signal based on said detected magnitude value,

generating a function signal corresponding to a preselected function, and



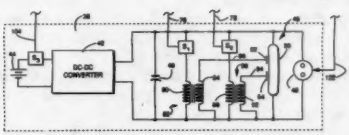
comparing said comparison with said function signal, and when the comparison signal is different than the function signal, changing the amount of cooling gas impinging on said bulb, until the comparison signal is equal to or approaches the function signal.

4,978,892

VARIABLE COLOR-OUTPUT STROBE

Stephanie Petrakos, Quincy, and John P. Gaewsky, Reading, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 27, 1988, Ser. No. 289,693
Int. Cl.[5] H01J *61/16*
U.S. Cl. 315—358 **8 Claims**



1. A flash discharge apparatus, comprising: an airtight housing through which light may be transmitted, for enclosing a mixture of gases;

a mixture of gases contained within said housing, with at least two of the gases forming said mixture having different ionization potentials;

means for generating at least two electrical potentials with each such electrical potential having a different period magnitude; and

means for coupling one of said electrical potentials to said gas mixture for the ionization of one of the gases forming said gas mixture without ionizing another, for the generation of a source of light having a particular spectral content and for the transmission of said light outwardly of said airtight housing.

4,978,893

LASER-TRIGGERED VACUUM SWITCH

Paul J. Brannon, Albuquerque, N. Mex., and Donald F. Cowgill, Danville, Calif., assignors to The United States of American as epresented by the United States the Department of Energy, Washington, D.C.

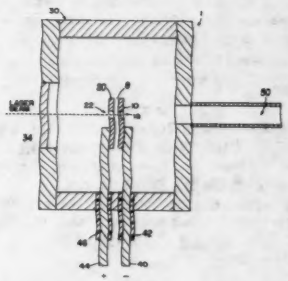
Filed Sep. 27, 1988, Ser. No. 249,815
Int. Cl.[5] H01J *45/00*
U.S. Cl. 315—150 **18 Claims**

1. A laser-triggered vacuum switch comprising:

a hermetically sealed evacuated envelope;

an anode electrode within and insulated from said envelope and connected to a positive voltage to be switched;

a cathode electrode within and insulated from said envelope and insulated from said anode and connected to a negative voltage to be switched, said cathode being spaced from said anode by a discharge gap;



solid material means for thermally activated field emission of electrons and ions upon interaction with a laser beam, said material being in contact with said cathode with a surface facing the discharge gap; and

means for conducting a laser beam to said solid material;

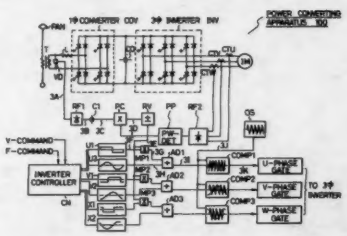
wherein electrons and ions released by said material upon contact of a laser beam result in a plasma breakdown across the discharge gap, thereby closing said switch.

4,978,894

SINGLE PHASE TO THREE PHASE RECTIFIER/INVERTER WITH DC RIPPLE COMPENSATION

Eimei Takahara, Koganei, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 6, 1989, Ser. No. 403,363
Claims priority, application Japan, Sep. 8, 1988, 63-223407
Int. Cl.[5] H02P *7/63*; H02M *5/452*
U.S. Cl. 318—768 **8 Claims**



1. A power converting apparatus comprising:

power converter means for converting a single-phase AC input voltage into a DC input voltage having ripple components:

filter means for smoothening said ripple components from said DC input voltage supplied from said power converter means so as to derive an input DC voltage;

DC/AC inverter means for inverting said input DC voltage into a three-phase AC voltage to be applied to a three-phase load;

detector means for detecting voltage variations proportional to said ripple components from said single-phase AC input voltage to obtain a phase component of the single-phase AC input voltage variations;

reference signal generating means for generating a reference signal;

inverter command correcting means for correcting inverter commands having a frequency command and a voltage command based upon said phase component of said single-phase AC input voltage variations so as to produce a modulating signal; and,

modulator means for modulating a carrier wave of said reference signal with said modulating signal in order to obtain a control signal for controlling said DC/AC inverter means in a pulse width modulation control mode.

4,978,895

ELECTRONIC CONTROL CIRCUIT FOR BRUSHLESS DIRECT CURRENT MOTOR

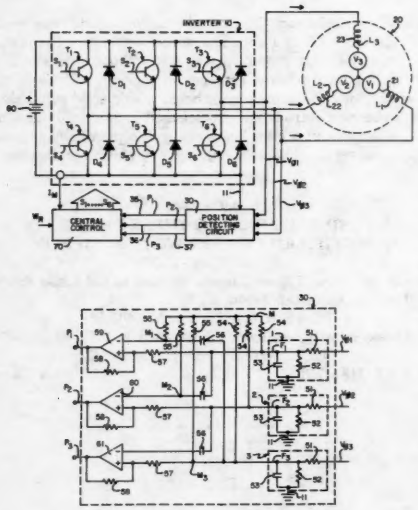
Marcos G. Schwarz, Rua General Osorio, Conjunto Belvedere 02, 89200 Joinville SC, Brazil

Filed Oct. 16, 1989, Ser. No. 421,605

Claims priority, application Brazil, Oct. 17, 1988, 8805485

Int. Cl.[5] H02P *6/02*

U.S. Cl. 318—254 **6 Claims**



1. An electronic control circuit for a brushless direct current motor of the type having stator coils and a permanent magnet rotor which produces an induced voltage in each stator coil upon rotor rotation, comprising:

inverter means for supplying current separately to each of the stator coils;

a rotor-stator relative position detecting circuit comprising:

a low pass filter for each stator coil for receiving the voltage induced therein;

a plurality of voltage comparator means, each for producing control signals to be used to control said inverter means, each said comparator means having a first input for receiving the voltage output of one of the low pass filters; p1 means for producing an average of the voltage at the outputs of the low pass filter and applying the average voltage to a second input of each of the comparator means; and

a respective high pass filter means connected to the output of each low pass filter, the output of each high pass filter means being applied to the second input of the comparator means different from the comparator means receiving the output of the low pass filter at the first input.

4,978,896

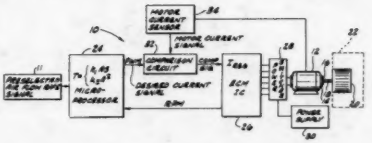
METHOD AND APPARATUS FOR CONTROLLING A BLOWER MOTOR IN AN AIR HANDLING SYSTEM

Rajendra K. Shah, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Jul. 26, 1989, Ser. No. 385,664

Int. Cl.[5] G05D *29/00*

U.S. Cl. 318—254 **28 Claims**



25. Apparatus for controlling a fluid handling system including a motor having a stationary assembly with a plurality of winding stages for carrying motor current and further having a rotatable assembly in driving relation with a fluid pump in the fluid handling system, the system further including means for generating a desired system parameter signal which varies as a function of a desired value for the parameter, and means for generating a motor current signal representative of the motor current, the apparatus providing control of the fluid pump over a range of various operating conditions of the fluid handling system to maintain the parameter at substantially the desired value, the apparatus comprising:

means for providing a speed signal representative of the speed of the motor;

a microprocessor, responsive to both the desired parameter signal and the speed signal, for generating a desired current signal which is a function of both the desired parameter signal and the speed signal;

means for comparing the desired current signal to the motor current signal and for supplying a comparison signal in response to the comparison; and

means for applying a motor voltage to one or more of the winding stages at a time in accordance with the comparison signal and for commutating the winding stages in a preselected sequence to rotate the rotatable assembly whereby the fluid pump is driven to maintain the value of the parameter at substantially the desired value substantially independent of variations in the operating conditions of the fluid handling system.

27. Method for controlling an air handling system including a motor having a stationary assembly with a plurality of winding stages for carrying motor current and further having a rotatable assembly in driving relation with a fluid pump in a fluid handling system, the system further including means for generating a desired system parameter signal which varies as a function of a desired value for the parameter, the method providing control of the fluid pump over variations in the operating conditions of the fluid handling system to maintain the parameter at substantially the desired value, the method comprising the steps of:

sensing the torque of the motor;

sensing the speed of the motor;

determining, by use of a microprocessor which is responsive to both the desired system parameter signal and the sensed motor speed, a desired torque which is a function of both the desired system parameter signal and the sensed motor speed;

comparing the desired torque to the sensed motor torque;

applying a motor voltage to one or more of the winding stages at a time in accordance with the comparison; and

commutating the winding stages in a preselected sequence to

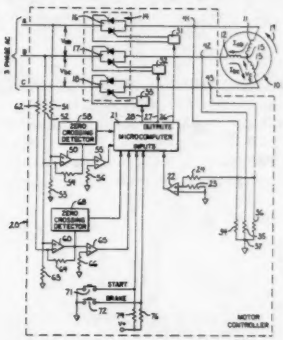
rotate the rotatable assembly whereby the fluid pump is driven by varying the motor torque according to the motor speed to maintain the value of the parameter at substantially the desired value substantially independent of variations in the operating conditions of the fluid handling system.

4,978,897

MOTOR CONTROLLER WITH AN IMPROVED STOPPING TECHNIQUE

John C. Merrison, Wauwatosa; Robert J. DeLange, St. Francis, and Timothy M. Rowan, Wauwatosa, all of Wis., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Apr. 26, 1990, Ser. No. 514,896
Int. Cl.[5] H02P *3/18*
U.S. Cl. 318—268 **17 Claims**



1. An apparatus for controlling an electric motor which has first, second and third windings supplied by a source of alternating voltage having three phases A, B and C, said apparatus comprising:

first, second and third switch means respectively coupling the first, second and third windings to the three phases A, B and C of the source when said switch means are rendered conductive by trigger signals; and

means for applying trigger signals to said switch means to produce a negative motor torque wherein:

when the speed of the motor is above a first predefined level, trigger signals are applied to said first and second switch means in response to the polarity of the voltage between phases A and B being opposed to the polarity of back emf voltage induced across said third winding, and

when the speed of the motor is below the first predefined level, trigger signals are applied to said second and third switch means in response to the polarity of the voltage between phases B and C being opposed to the polarity of back emf voltage induced across said third winding.

4,978,898

MOTOR DRIVING AND MALFUNCTION DETECTING DEVICE

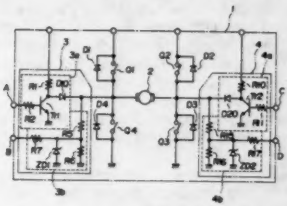
Akihiko Tsukahara; Toshio Iwaoka; Yuichi Yamaguchi, and Tsutomu Danzaki, all of Yokohama, Japan, assignors to Jidosha Denki Kogyo Kabushiki Kaisha, Kanagawa, Japan

Filed Jan. 9, 1990, Ser. No. 462,208
Claims priority, application Japan, Jan. 11, 1989, 1-5325
Int. Cl.[5] H02P *1/22*
U.S. Cl. 318—280 **1 Claim**

1. A motor driving and malfunction detecting device for an electric motor having two terminals, comprising:

a plurality of switching means, each connected to one terminal of said motor in an H-bridge connection for driving said motor in a forward or reverse direction by switching said respective switching means;

a plurality of malfunction detecting means, each of said malfunction detecting means is connected to one terminal of said motor;



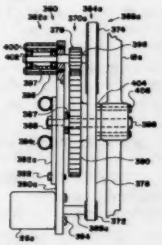
each of said malfunction detecting means having an impression part and a detecting part, wherein the impression part inputs a voltage to said respective switching means, the detection part detects a voltage level responsive to the input voltage of the impression part for determining the malfunction of the respective switching means.

4,978,899

CONVEYANCE WITH ELECTRONIC CONTROL FOR MOTORS

Lloyd L. Lautzenhiser, Lot 6, Concession 12, Carling Township, Nobel, Ontario, Canada (POG 1GO), and John L. Lautzenhiser, 110 Bowes Street, Parry Sound, Ontario, Canada (P2A 2L7)

PCT No. PCT/US87/02778, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO88/03400, PCT Pub. Date May 19, 1988
Continuation-in-part of Ser. No. 927,273, Nov. 4, 1986, Pat. No. 4,906,906. This PCT application Oct. 29, 1987, Ser. No. 354,188
Claims priority, application New Zealand, Nov. 3, 1987, 222430; Spain, Nov. 3, 1987, 8703138; Mexico, Nov. 4, 1987, 9140
Int. Cl.[5] H02P *3/08*
U.S. Cl. 318—269 **23 Claims**



1. A conveyance (**360**) having a propulsion element (**12*a***), having an electric motor (**26*a***), having a power transmission (**364*a***) that drivingly connects said electric motor to said propulsion element, having motor control means (**332*a*** or **334*a***) for supplying a driving voltage (**209*a***) to said motor (**26*a***), and having means (**56**) for selectively obviating said supplying of said driving voltage to said electric motor, the improvement which comprises:

means, comprising said power transmission, for allowing said propulsion element to drive said motor;

parking mode means (**152*a*** and **154*a***) for making said motor function as an electrically loaded generator when said

propulsion element is driving said motor and said supplying of said driving voltage is obviated; and

manual propelling means (**408***a*) for selectively inactivating said parking mode means; whereby

said conveyance is manually propelled, and said propulsion element drives said motor without said motor (**26***a*) functioning as an electrically-loaded generator.

14. A method specially adapted for electrically propelling, braking, and manually-propelling a conveyance (**360**) that includes a propulsion element (**12***a*), an electric motor (**26***a*), and a power transmission (**364***a*) that drivingly connects said electric motor to said propulsion element, which method comprises the steps of:

(a) supplying a driving voltage (**209***a*) to said motor (**26***a*);

(b) selectively isolating (**56**) said motor from said driving voltage;

(c) making said power transmission power reversible, whereby said propulsion element drives said motor;

(d) causing said motor to function as an electrically loaded generator when said propulsion element drives said motor;

(e) selectively inactivating said causing step; and

(f) manually propelling said conveyance whereby said propulsion element drives said motor without said motor functioning as an electrically loaded generator.

4,978,900

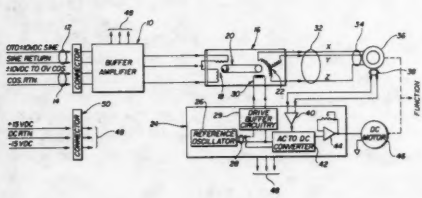
DC SINE COSINE SERVO SYSTEM

Louis Skawinski, Amber Lakes, Long Pond, Pa. 18334

Filed Feb. 27, 1989, Ser. No. 315,607

Int. Cl.[5] **G08C** *19/00*; **H03M** *1/64*

U.S. Cl. 318—560 **2 Claims**



1. A DC to DC sine/cosine positioning servo system comprising:

a. a first electro-mechanical DC to AC converter means including DC torquer means having a rotor with respective windings for receiving two DC input signals proportional to the error signal detected, whereby mechanical movement of the rotor is accomplished in direct proportion to the relative values of the two input signals; and, including

synchro control transmitter means having a rotor mechanically coupled to the rotor of said DC torquer means and having a synchro control transmitter rotor winding and synchro control transmitter stator windings;

b. reference oscillator means for producing an AC output voltage at a predetermined frequency;

c. means for electrically connecting the AC output voltage produced by said reference oscillator means to the synchro control transmitter rotor winding,

said synchro control transmitter stator windings having a voltage produced thereacross proportional to the angular relationship between said synchro control transmitter rotor and said stator windings;

d. a first control transformer means, including stator windings and a rotor winding,

said control transformer stator windings electrically connected to the stator windings of said synchro control transmitter means,

said control transformer rotor winding having produced thereacross an AC voltage proportional to the angular position of the rotor of said control transformer in relation to the stator windings of said control transformer and proportional to the voltage appearing across the stator windings of said control transformer;

electrically connected to the rotor winding of said control transformer means and second circuit means electrically connected to the output of said reference oscillator means,

said AC to DC converter circuit means producing an output DC signal proportional to the AC signal appearing across the rotor winding of said control transformer means in relation to the AC output voltage of said reference oscillator means;

f. dc motor means responsive to the DC output signal produced by said AC to DC converter circuit means whereby said DC motor is rotated in response to said DC signal, said DC motor mechanically coupled to the rotor of said control transformer means and to the device producing the input signals whereby the control transformer rotor and said device are mechanically driven to a null position.

4,978,901

MACHINING DATA FORMING SYSTEM FOR NUMERICAL CONTROL DEVICE

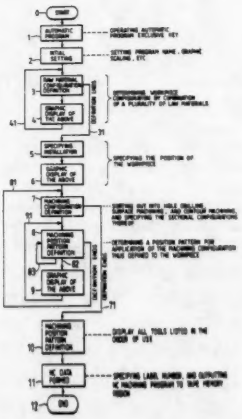
Hayao Hirai, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,529

Claims priority, application Japan, May 16, 1988, 63-116948

Int. Cl.[5] **G05B** *19/403*

U.S. Cl. 318—600 **12 Claims**



1. A machining data forming system for a numerical control device in which machining data are inputted to the system by input means through operator interaction with a display unit, comprising:

means for successively displaying on said display unit a machining menu comprising a plurality of questions with regard to either an arc or a circle on which there are machining points;

means for providing the coordinates of a center positions of the arc or circle based on reference point data inputted via said input means as a response to the questions to display the machining points on the arc or circle on said display unit,

said input data including at least the coordinates of start and end points of the machining points based on positioning direction (θ) and arc or circle radius (R).

means for providing the coordinates of a center position of the arc or circle based on data inputted as a response to the questions to display the machining points on the arc or circle on said display unit,

said input data including at least a random pitch angle.

4. A machining data forming system for a numerical control device in which machining data are inputted through interaction with a display unit, comprising:

means for successively displaying on said display unit a plurality of questions with regard to either an arc or a circle on which there are machining points;

means for providing the coordinates of a center position of the arc or circle based on data inputted as a response to the questions to display the machining points on the arc or circle on said display unit,

said input data including at least a random pitch angle.

4,978,902

SYNCHRONOUS ROTATION CONTROL SYSTEM OF MAGNETICALLY RECORDING DISK

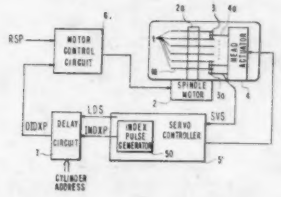
Toshifumi Hatagami, Machida; Masahito Iwatsubo, and Tooru Shinohara, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 29, 1988, Ser. No. 150,220

Claims priority, application Japan, Jan. 29, 1987, 62-019389

Int. Cl.[5] G05B *1/02*

U.S. Cl. 318—608 **21 Claims**



1. An apparatus for synchronous control of a magnetic recording disk having cylinders, each cylinder having a cylinder number represented as a cylinder address and an index mark, said apparatus comprising:

read means for reading the index marks from the cylinders and generating index pulses in response thereto; and

delay means for delaying each of the index pulses by a delay amount to output delayed index pulses at a predetermined time, the delay amount varying in dependence upon the cylinder number corresponding thereto, said delay means delays in accordance with a curve representing the delay amount of the index pulses with respect to the cylinder address, the curve is essentially the complement of a curve representing the misalignment of the index marks with respect to the cylinder address.

4,978,903

APPARATUS FOR THE CONTROL OF A THREE-PHASE A.C. MOTOR, ESPECIALLY A SQUIRREL-CAGE MOTOR

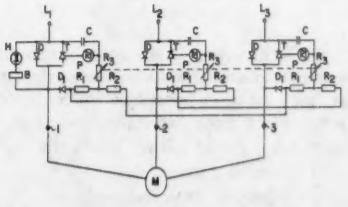
Aarno Ahola, Lahti, Finland, assignor to A-teollisuus Oy, Lahti, Finland

Filed Jul. 17, 1989, Ser. No. 380,416

Claims priority, application Finland, Jul. 19, 1988, 883415

Int. Cl.[5] H02P *1/26, 7/62*

U.S. Cl. 318—778 **9 Claims**



1. An apparatus for the control of a three-phase a.c. motor, said apparatus comprising:

inverse-parallel connected solid-state components in each phase, at least one of said solid-state components being controllable; and

a control circuit for each controllable solid-state component, each control circuit connected to control circuits in other phases in order to form control signals for said controllable solid-state component, so that the control signals are formed in the control circuit by combining signals obtained from other control circuits,

each control circuit including three resistors,

a first terminal of a second resistor connected to a second terminal of a first resistor and a second terminal of said second resistor connected to a first terminal of a first resistor in a control circuit in some other phase, and a first terminal of a third resistor connected between said first and second resistor and a second terminal of said third resistor connected via a control component to a control electrode of the controllable solid-state component.

4,978,904

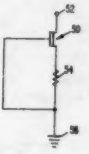
CIRCUIT FOR GENERATING REFERENCE VOLTAGE AND REFERENCE CURRENT

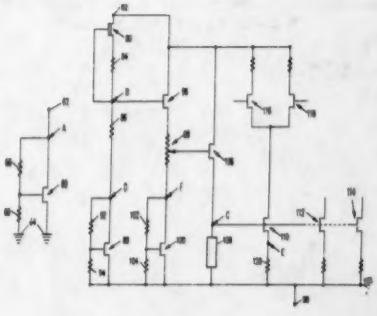
Mark E. Fitzpatrick, San Jose, and Gary R. Gouldsberry, Cupertino, both of Calif., assignors to Gazelle Microcircuits, Inc., Santa Clara, Calif.

Continuation of Ser. No. 133,668, Dec. 15, 1987, abandoned. This application May 30, 1989, Ser. No. 358,474

Int. Cl.[5] G05F *3/24*

U.S. Cl. 323—313 **21 Claims**





1. A semiconductor device comprising a circuit for generating a reference voltage upon application of a voltage thereto, wherein variation in reference voltage versus temperature is equal to or less than 0.75 mv/° C., and said device is implemented in compound semiconductor technology.

4,978,905

NOISE REDUCTION OUTPUT BUFFER

David Hoff, San Jose, and Saroj Pathak, Los Altos Hills, both of Calif., assignors to Cypress Semiconductor Corp., San Jose, Calif.

Filed Oct. 31, 1989, Ser. No. 429,722

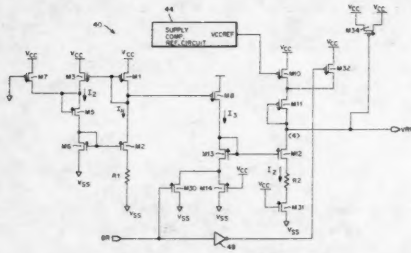
Int. Cl.[5] G05F *3/24*

U.S. Cl. 323—314 **12 Claims**

1. In an MOS integrated circuit device which receives a

supply voltage and is characterized by at least one output circuit which drives an output terminal with an output signal, the output circuit characterized by a current sinking capability and by a state switching speed, a compensation circuit for compensating for supply voltage variations, comprising:

circuit means for generating a supply compensation signal which is not at ground and which does not increase as the supply voltage increases, and means for generating a reference voltage signal, such that said reference signal varies in dependence on the supply voltage, whereby said reference voltage signal rises as the supply voltage rises, and become smaller as the supply voltage drops, said



reference voltage signal generator means responsive to said supply compensation signal and said supply voltage to vary a gate drive on a first MOS transistor device characterized by a gate; and

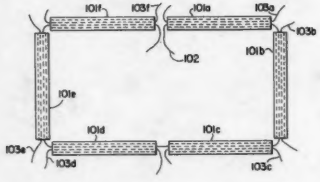
output circuit current modulating means responsive to said reference signal for modulating the current sinking capability of said output circuit, to reduce the current sinking capability as the reference signal increases and thereby reducing the output circuit state switching speed, and conversely increasing the current sinking capability as the reference signal decreases, thereby increasing the output circuit state switching speed.

4,978,906

PICTURE FRAME MATRIX TRANSFORMER

Edward Herbert, Canton, and Stephen E. Cebry, Burlington, both of Conn., assignors to FMTT, Inc., Canton, Conn.

Filed Mar. 29, 1989, Ser. No. 330,199
Int. Cl.[5] H01F *31/00*
U.S. Cl. 323—361 **17 Claims**



1. A picture frame matrix transformer, comprising:

a plurality of interdependent magnetic elements;

at least one plurality winding comprising an electrical conductor; each conductor having first and second ends;

at least one secondary winding comprising an electrical conductor, each conductor having first and second ends;

each of said plurality of interdependent magnetic elements being arranged end-to-end with an immediately adjacent magnetic element in a closed pattern configuration;

one of said at least one primary winding and one secondary winding passing at least once through each of said plurality of interdependent magnetic elements, one of said first and second ends of one of said at least one primary and secondary winding ending at an end-to-end position between adjacent magnetic elements where the other of said first and second ends of another of said at least one primary and secondary winding begins;

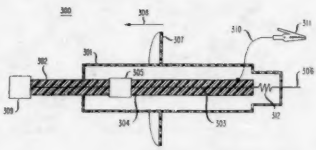
each of said plurality of magnetic elements further having at least one turn of the other of at least one primary and secondary windings with the winding being associated one-for-one with said plurality of magnetic elements, one of said first and second ends of said winding associated with one magnetic element ending at the end-to-end position between magnetic elements where one of said first and second ends of a winding associated with an adjacent magnetic elements begins, said ending of one winding and the beginning of an adjacent winding at an end-to-end position between magnetic elements being repeated for each of said end-to-end positions.

4,978,907

APPARATUS AND METHOD FOR EXPANDING THE FREQUENCY RANGE OVER WHICH ELECTRICAL SIGNAL AMPLITUDES CAN BE ACCURATELY MEASURED

Douglas C. Smith, Rumson, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 10, 1989, Ser. No. 349,724
Int. Cl.[5] G01R *1/02, 31/00*
U.S. Cl. 324—72.5 **10 Claims**



1. A probe for use with measurement equipment, said probe having an input impedance and comprising a probe tip for receiving signals from a circuit under test, a signal conducting lead having a capacitance and having a first end connected to said probe tip, and a ground lead for connection to said circuit under test, said ground lead having an inductance, the respective capacitance and inductance of said signal conducting lead and said ground lead forming a resonant circuit having a non-flat frequency response, and said probe further including a resistor serially connected between said probe tip and said first end of said signal conducting lead, said resistance providing a resistance value substantially less than said input impedance so as to substantially flatten said frequency response, whereby accurate amplitude measurements of signals over a wide range of frequencies are provided.

4,978,908

SCANNING ELECTRON MICROSCOPE BASED PARAMETRIC TESTING METHOD AND APPARATUS

Shivaling S. Mahant-Shetti, Richardson; Thomas J. Aton, Dallas, and Rebeca J. Gale, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 22, 1989, Ser. No. 327,080
Int. Cl.[5] G01R *31/28*
U.S. Cl. 324—158 R **6 Claims**

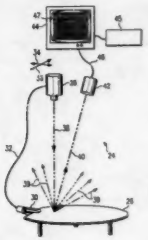
1. A method for evaluating and testing manufacturing processes on a semiconductor wafer, comprising the steps of:

providing a test structure having a first conductive region and a second conductive region, wherein said second conductive region of said test structure is isolated from any functional circuitry;

biasing said first conductive region;

directing an irradiating beam at said second conductive region to free electrons from said test structure, wherein

said free electrons represent the connectivity or isolation between said first and second conductive regions; and

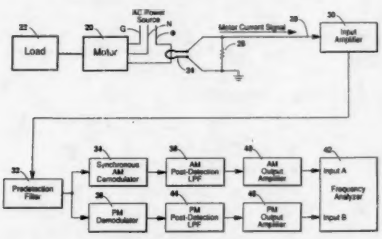


detecting a portion of said free electrons to allow evaluation and testing of the processes.

4,978,909
DEMODULATION CIRCUIT FOR AC MOTOR CURRENT SPECTRAL ANALYSIS

Donald E. Hendrix, Oak Ridge, and Stephen F. Smith, Knoxville, both of Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Continuation of Ser. No. 270,978, Nov. 14, 1988, abandoned. This application Aug. 31, 1989, Ser. No. 401,728
Int. Cl.[5] G01R *23/16*
U.S. Cl. 324—77 B **18 Claims**



18. A system for obtaining frequency-domain motor current signatures comprising:

means for amplifying a time-domain motor current signal;

means coupled to said amplifying means for synchronously AM demodulating said motor current signal to obtain a derived time-domain motor current signal;

means coupled to said AM demodulating means for low-pass filtering said derived motor current signal;

means coupled to said low-pass filtering means for amplifying said filtered derived motor current signal;

means coupled to said amplifying means for PM demodulating said motor current signal to obtain a second derived time-domain motor current signal;

means coupled to said PM demodulating means for low-pass filtering said second derived motor current signal;

means coupled to said second low-pass filtering means for amplifying said filtered second derived motor current signal;

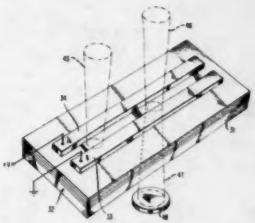
means coupled to said derived motor current signal amplifying means for transforming said derived time-domain motor current signal into a frequency spectrum; and

means coupled to said second derived motor current signal amplifying means for transforming said second derived time-domain motor current signal into a frequency spectrum.

4,978,910
ELECTROOPTIC APPARATUS FOR THE MEASUREMENT OF ULTRASHORT ELECTRICAL SIGNALS

Wayne H. Knox, Rumson, and David A. B. Miller, Fair Haven, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 26, 1989, Ser. No. 371,475
Int. Cl.[5] G01R *31/00*; H01L *27/14*
U.S. Cl. 324—96 **10 Claims**



1. An electrooptic apparatus for measuring a characteristic of an electrical signal comprising:

a multiple quantum well structure comprising substantially semi-insulating semiconductor material;

first and second coplanar transmission lines positioned over said multiple quantum well structure;

means for contacting a fixed electrical potential between said first and second coplanar transmission lines;

means for illuminating by an optical beam a region between said first and second coplanar transmission line that substantially includes said multiple quantum well structure; and

means for injecting said electrical signal between said coplanar transmission lines, said multiple quantum well structure responsive to variations in amplitude of said electrical signal for modulating a characteristic of said optical beam to produce a modulated optical beam.

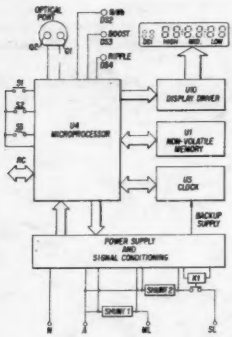
4,978,911
ELECTRICAL ENERGY ANALYZER

Phillip J. Perry; John A. D. Meldrum; Jordon Metlikovec; Michael J. Bauer, and Clive S. White, all of Heidelberg West, Australia, assignors to Oliver J. Nilsen (Australia) Limited, Victoria, Australia

Continuation of Ser. No. 10,594, Feb. 3, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 325,034
Claims priority, application Australia, Feb. 6, 1986, PH04478
Int. Cl.[5] G01R *21/133*; H02J *3/14*; H03M *1/20*
U.S. Cl. 324—142 **5 Claims**

1. An electrical energy analyzer including at least one current sensing means, a voltage sensing means, at least one analog to digital converter responsive to a measurement signal for digitizing sensed voltage and current values, computing means for constantly monitoring electrical energy consumption based on said digitized current and voltage values, data storage means for holding calculated and other required data, and display means for displaying selected data, wherein each current sensing means includes a shunt, the voltage across which is amplified and fed to an analog switch for processing by said at least one analog to digital converter; and wherein each shunt voltage is amplified using a differential amplifier which has a square wave switched offset signal applied to the non-inverting input of said differential amplifier, said square wave having an

offset of ½ LSB and wherein the amplified signal from each said differential amplifier has limited filtering to allow a random



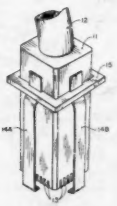
signal to be applied to the measurement signal entering said at least one analog to digital converter.

4,978,912

CHIP CARRIER SOCKET TEST PROBE

David L. Vonder, Addison, and William A. Reimer, Wheaton, both of Ill., assignors to AG Communication Systems Corporation, Phoenix, Ariz.

Filed Oct. 23, 1989, Ser. No. 427,278
Int. Cl.[5] G01R *1/00, 1/02*
U.S. Cl. 324—158 P **8 Claims**



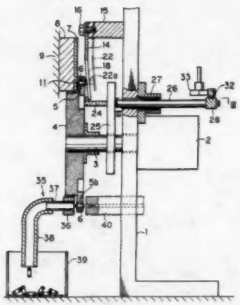
1. A test probe for use with a chip carrier socket comprising:
a body portion, including a plurality of sides and first and second ends;
said first end configured for insertion into and mating with said chip carrier socket;
a plurality of electrical contacts located on said first end of said probe body portion;
a plurality of electrical conductors each attached to at least one of said electrical contacts internally of said body portion and adapted to be connected to an associated electrical testing device;
a plurality of socket engagement means each attached to said body for grasping said socket;
a square shaped slip-ring device encircling said plurality of socket engagement-means, to apply equal pressure to all of said engagement means simultaneously when manually moved towards said probe first end;
and indexing means comprising the cross-sectional geometry of said test probe body adapted to be aligned to correspond to indexing means included in said chip carrier socket;
whereby in response to insertion into said socket, said probe body indexing means and corresponding indexing means included in said carrier socket ensure proper orientation of said probe in said socket, and in response to said engatement means grasping said socket, both electrical and mechanical connection is established between said probe and said chip carrier socket.

4,978,913

APPARATUS FOR MEASURING CHARACTERISTICS OF CHIP ELECTRONIC COMPONENTS

Mitsuroh Hamuro; Yoshitaka Hata; Shigeo Hayashi, and Akihiko Takahashi, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jan. 18, 1990, Ser. No. 467,017
Claims priority, application Japan, Jan. 24, 1989, 1-15834; Jan. 24, 1989, 1-15835; Jan. 24, 1989, 1-15836
Int. Cl.[5] G01R *31/26;* **B07C** *5/02*
U.S. Cl. 324—158 F **11 Claims**



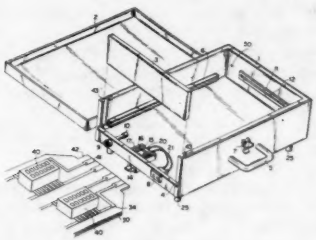
1. An apparatus for measuring electric characteristics of chip electronic components having first and second electrodes provided on first and second opposite end surfaces respectively, said apparatus comprising:
a movable holding member provided with a plurality of holding holes arranged at constant pitches for receiving said chip electronic components through said holes so that first and second end portions thereof including said first and second end surfaces of said chip electronic components project therefrom respectively and said holding holes being arranged along the direction of movement of said holding member;
a plurality of fixed terminals planarly arranged in correspondence to said holding holes of said movable holding member and capable of being in contact with said first end surfaces of said chip electronic components held in said holding holes; and
a plurality of movable terminals arranged to oppose said fixed terminals and separated therefrom by said movable holding member, said movable terminals being formed at least partially of an elastically flexible plate member and being disposed for being elastically in contact with said second end surfaces of said chip electronic components held in said holding holes.

4,978,914

LAMINATED BOARD FOR TESTING ELECTRONIC COMPONENTS

Mitsuru Akimoto; Takamasa Jimbo; Kiyoshi Umemura; Haruhiko Iwase, and Kenzirou Ogawa, all of Kanagawa, Japan, assignors to Furukawa Denki Kogyo Kabushiki Kaisha, Tokyo and Yamaichi Denki Kogyo Kabushiki Kaisha, both of, Japan

Continuation of Ser. No. 323,450, Mar. 14, 1989, abandoned. This application Apr. 24, 1990, Ser. No. 517,433
Claims priority, application Japan, Mar. 15, 1988, 63-59241; Aug. 4, 1988, 63-195412
Int. Cl.[5] G01R *31/02, 1/04*
U.S. Cl. 324—158 F 33 Claims



1. A laminated board for testing electronic components comprising:

a metal plate;

a testing circuit layer integrally formed through a first electric insulting layer on one side of said metal plate for mounting thereon electronic components to be tested; and

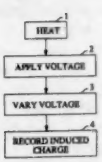
a heater circuit layer integrally formed through a second electric insulating layer on the other side of said metal plate, said second electric insulating layer transmitting heat generated by said heater circuit layer to said testing circuit layer for maintaining said testing circuit layer at a predetermined temperature.

4,978,915

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES INVOLVING THE DETECTION OF IMPURITIES

John M. Andrews, Jr., Watchung; Nadia Lifshitz, Bridgewater, and Gerald Smolinsky, Madison, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 7, 1989, Ser. No. 432,947
Int. Cl.[5] G01R *27/26, 31/26*
U.S. Cl. 324—158 R 7 Claims



1. A method of semiconductor device fabrication including the step of detecting an impurity in a dielectric layer which is a part of the body such device, wherein the detecting step comprises:

heating the body to an elevated temperature;

applying a voltage across the dielectric layer;

and varying the voltage between a maximum negative amplitude and a maximum positive amplitude;

characterized in that

the varying step comprises changing the voltage in discrete increments separated by time intervals, whereby a charge is induced by ionic impurity motion during each time interval; and

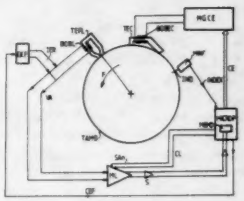
the method further comprises the step of recording the induced charges.

4,978,916

METHOD FOR MAGNETICALLY CHARACTERIZING THE RECORDING LAYER OF A MAGNETIC INFORMATION CARRIER, AND APPARATUS FOR PERFORMING THE METHOD

Christian Combettes, Bercheres S/Vesgre, and René Lefebvre, Montigny Le Bretonneux, both of France, assignors to Bull S.A., Paris, France

Filed Jun. 26, 1989, Ser. No. 371,532
Claims priority, application France, Jun. 29, 1988, 88 08773
Int. Cl.[5] G01R *33/12;* G11B *27/36, 5/004*
U.S. Cl. 324—212 14 Claims



1. A method for ascertaining the magnetic characteristics of primary magnetization of the recording layer of a movable magnetic information carrier including a plurality closed recording tracks P each having a synchronization index (IND) located by locating means (MIND) which furnish a synchronization pulse (I_{N-2}, I_{N-1}, I_N, . . .) upon each passage of the index past them, characterized in that for each track, a succession of p distinct sequences SEQ_1, SEQ_2, . . . , SEQ_{j+1}, SEQ_p is effected, where j is an entire number equal to 1, 2 . . . p and where all successive sequences SEQ_j include four successive operations a, b, c, d, each sequence SEQ_j occurring just once when the last operation of preceding sequence SEQ_{j-1} is completed the four successive operations being:

(a) magnetically erasing the layer over the entire surface of the track upon the reception of a first synchronization pulse (I_{N-2}), to make its magnetic state neutral;

(b) producing a magnetic field H by a periodic writing current SC of a predetermined amplitude I_j and a predetermined frequency which is the same for each sequence, the succession of amplitudes I_1, I_2, I_j . . . I_p being of increasing order the absolute value of amplitude I_j being greater than the absolute value of I_{j-1} (Sequence SEQ_{j-1}) and such that $|I_j| - |I_{j-1}| = \Delta I$ where $\Delta I > 0$, I_p being the value of I_j at which the magnetic layer is saturated and p defines the precision required for defining the primary magnetization curve and I_1 being the value closest to 0;

(c) writing by means of said magnetic field H a succession of magnetic domains (A_i, A_{i+1}, A_{i+2}) on the entirety of said surface upon the reception of a second synchronization pulse (I_{N-1}); and

(d) reading a voltage S which is a function of the magnetization M inside of each of the domains read at these times, thus obtaining a plurality of values of S for the same value I_j, upon the reception of a third synchronization pulse (I_N), at predetermined sampling times (t_n, P_{n+1}, . . .), with a predetermined sampling period T_E greater than the period T of the writing period where T is proportional to

the length of each magnetic domain measured parallel to the direction of travel of the carrier and the inverse of the speed of the carrier.

4,978,917

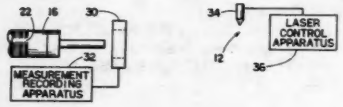
METHOD FOR NONDESTRUCTIVE MEASUREMENT OF HEAT AFFECTED ZONE OF IDENTIFICATION CODE ON NUCLEAR FUEL ROD

Mark P. Goldenfield, Columbia; David V. Lambert, St. Matthews, both of S.C., and Robert E. Shannon, Penn Township, Westmoreland County, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 4, 1989, Ser. No. 389,919

Int. Cl.[5] G01N *27/90*; G01R *33/12*

U.S. Cl. 324—226 **12 Claims**



1. A method for nondestructive measurement of the heat affected zone of an identification code on a nuclear fuel rod tube, comprising the steps of:

(a) applying laser power to a portion of a nuclear fuel rod tube to generate an identification code thereon;

(b) placing the portion of the tube with the code generated thereon in the magnetic field of an eddy current generating and sensing device;

(c) measuring the change in impedance of the device produced by the code-bearing portion of the tube; and

(d) comparing the impedance change produced by the code-bearing tube portion with an impedance change produced by a tube portion not having the code thereon to determine whether a maximum allowed depth of the heat affected zone of the tube portion has been exceeded.

4,978,918

MAGNETIC RESONANCE IMAGING METHOD

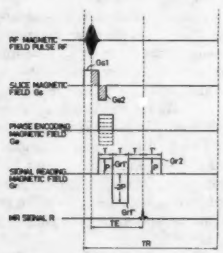
Hidenobu Sakamoto, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 9, 1989, Ser. No. 349,213

Claims priority, application Japan, Apr. 24, 1988, 63-103744; May 16, 1988, 63-116933; Jul. 18, 1988, 63-176994; Sep. 16, 1988, 63-229850

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **11 Claims**



1. A method of NMR or ESR, or the like imaging in which an RF magnetic field pulse, a slice magnetic field, a phase encoding magnetic field and a signal reading magnetic field are applied to a sample in a predetermined sequence, for the construction of a desired slice image on the basis of a magnetic resonance signal from the sample, comprising the steps of:

applying a first signal reading magnetic field having a predetermined pulse area;

applying a second signal reading magnetic field having a pulse area twice that of said predetermined pulse area and having a polarity opposite to that of said first signal reading magnetic field; and

applying a third signal reading magnetic field having the same polarity as that of said first signal reading magnetic field,

said steps of applying said first signal reading magnetic field, applying said second signal reading magnetic field and applying said third signal reading magnetic field are performed in the interval from the application of the RF magnetic field pulse and until a magnetic resonance signal is obtained, and

the peak value of said magnetic resonance signal is obtained when the pulse area of said third signal reading magnetic field becomes equal to said predetermined pulse area.

4,978,919

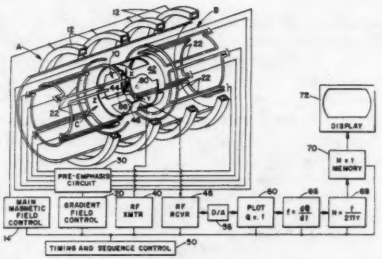
MEASUREMENT AND CALIBRATION OF EDDY CURRENTS FOR MAGNETIC RESONANCE IMAGERS

Richard S. Hinks, Cleveland Hts., Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Filed Apr. 27, 1989, Ser. No. 344,283

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—313 **21 Claims**



1. A method of measuring eddy currents induced in a magnetic resonance apparatus, the method comprising:

disposing a sample in a main magnetic field in an examination region of the magnetic resonance apparatus;

applying a preselected magnetic field gradient across the magnetic field in the examination region;

ending application of the preselected magnetic field gradient, ending application of the preselected magnetic field gradient causing eddying currents in adjacent portions of the magnetic resonance apparatus, which eddy currents generate an eddy current magnetic field gradient which decay with time as the eddy currents decay;

following the ending of the application of the preselected magnetic field gradients and during the eddy current magnetic field gradients, evoking a series of free induction decay signals from the sample at a series of times;

measuring signal phase of each free induction decay signal vs. time;

determining a slope of the measured phase vs. time, which slope is indicative of main and eddy current magnetic field strength, whereby the magnetic field strength is determined at each of the series of times following the ending of the application of the preselected magnetic field gradient.

4,978,920

MAGNETIC FIELD SCREENS

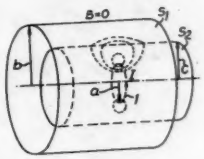
Peter Mansfield; Barry L. W. Chapman; Robert Turner, and Roger M. Bowley, all of Nottingham, England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 909,292, Sep. 19, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,392

Claims priority, application United Kingdom, Sep. 20, 1985, 8523326; Feb. 6, 1986, 8602911; Jun. 19, 1986, 8614912

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—318 37 Claims



1. A screen for forming a protective barrier against a magnetic field of a type which has been produced by an energized primary electrical coil, said screen comprising:

a set of electrical conductors defining two sides, one of which facing said primary electrical coil, and the other opposite said one side and on an opposite side of the primary electrical coil; and

means for supplying the conductors of the set with electrical currents of magnitude such that a resultant distribution of said currents differs from a primary current distribution in the primary electrical coil and approximates an induced current distribution which would be formed in a continuous superconductive surface positioned in the place of said set so as to make the field everywhere on said one side of the screen away from the primary electrical coil substantially zero and thereby, when activated, to completely reflect the magnetic field.

4,978,921

ELECTRODE PROBE FOR USE IN AQUEOUS ENVIRONMENTS OF HIGH TEMPERATURE AND HIGH RADIATION

Maurice E. Indig, Fremont, Calif., and Laura L. H. King, Raleigh, N.C., assignors to General Electric Company, San Jose, Calif.

Filed May 1, 1989, Ser. No. 345,738

Int. Cl.[5] G01N *27/02*

U.S. Cl. 324—446 17 Claims

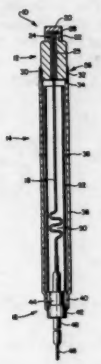
1. An electrode probe for employment in monitoring electrochemical potentials, comprising:

(a) a metal cap electrode having a tip portion, and an annulus extending therefrom which defines a cavity having an interior surface;

(b) an alumina retainer having a base with a sleeve attachment region and oppositely disposed cap securing portion nestably disposed within said cap electrode cavity and sealingly attached thereto, and an access channel penetrating therethrough from said base to said cap securing portion;

(c) a first annular metal sleeve formed of a metal exhibiting a coefficient of expansion compatible with said alumina retainer, and having an alumina retainer region in sealing engagement with said retainer sleeve attachment region, said sleeve having an oppositely disposed outlet;

(d) a first insulated electrical conductor in electrical connection with said cap electrode and extending through said retainer access channel and through said annular metal sleeve to said sleeve outlet; and



(e) a positioning and signal transfer assembly associated with said sleeve outlet for providing support for said sleeve and for conveying electrical signals from said conductor.

4,978,922

SUPERCONDUCTING SENSOR FOR QUENCH DETECTION IN A SUPERCONDUCTOR

George T. Mallick, Jr., Monroeville; James R. Logan, Hampton Township, Allegheny County, and Phillip W. Eckels, Penn Hills Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 31, 1989, Ser. No. 401,592

Int. Cl.[5] G01K *17/00;* G01R *27/00*

U.S. Cl. 324—652 8 Claims

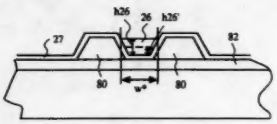
1. A quench detection sensor comprising a probe and a readout device, the probe capable of being placed in thermal contact with a turn of a superconducting coil and comprising a protective sheath surrounding two long twisted, insulated superconducting wires which are shorted at one end and form a sensor coil at the other end such that the sensor coil is magnetically coupled to a readout coil, the readout device comprising an energy source, the readout coil for magnetically providing energy to the probe and a detector for detecting a change in the amount of energy provided to the probe.

4,978,923

ELECTRICAL MEASUREMENTS OF THE PROFILE OF SEMICONDUCTOR DEVICES DURING THEIR MANUFACTURING PROCESS

Ron Maltiel, 933 Eichler Dr., Mountain View, Calif. 94040

Division of Ser. No. 343,755, Apr. 26, 1989. This application May 17, 1990, Ser. No. 525,424
Int. Cl.[5] G01R 27/02, 31/26
U.S. Cl. 324—693 4 Claims



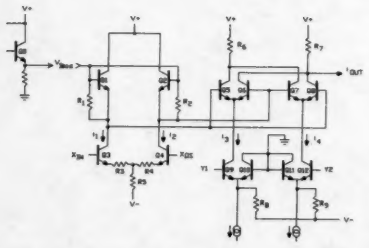
1. Method for measuring the profile of structures comprising the steps of:
forming a structure on a substrate, said structure having an opening therein for receiving electrically conductive liquid;
introducing said electrically conductive liquid into said opening;
measuring the electrical resistance of said electrically conductive liquid in said opening;
varying the amount of electrically conductive liquid in said opening after said step of measuring and
measuring said electrical resistance of said liquid after said step of varying.

4,978,924

LINEAR SWITCH WITH HIGH OFF-STATE ISOLATION

Daniel L Schuster, Portland, Oreg., assignor to Magni Systems, Inc., Beaverton, Oreg.

Filed Apr. 25, 1989, Ser. No. 343,195
Int. Cl.[5] H03F 3/45; H03K 17/00
U.S. Cl. 330—254 4 Claims



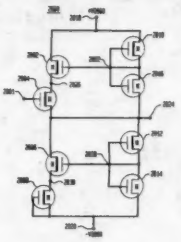
1. A linear switch comprising
transistor means for generating first and second control currents to produce an output current, said transistor means including first, second and third transistor pairs arranged in a Gilbert cell type arrangement, where each transistor of said first transistor pair includes a shutoff resistor to provide high isolation between currents in said second and third transistor pairs.

4,978,925

UNITY-GAIN CMOS/SOS ZERO-OFFSET BUFFER

Andrew G. F. Dingwall, Princeton, N.J., assignor to Harris Corporation, Melbourne, Fla.

Filed May 24, 1989, Ser. No. 356,311
Int. Cl.[5] H03F 3/16
U.S. Cl. 330—277 32 Claims



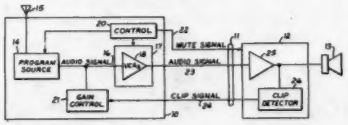
28. A combination comprising:
first and second field effect transistors each having first and second electrodes defining end of a conduction path and a gate electrode for controlling the conductivity of the conduction path;
the second transistor having a threshold voltage which is greater than the theshold voltage of the first transistor; and
feedback means, including the gate and first electrode of the second transistor, coupled to the first and second electrodes of the first transistor for establishing a potential across the conduction path of the first transistor which is substantially equal to the threshold voltage of the second transistor.

4,978,926

AUDIO LIMITER USING VOLTAGE MULTIPLEXED FEEDBACK

Richard D. Zerod, and Gregory R. Hamel, both of Livonia, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 21, 1989, Ser. No. 454,601
Int. Cl.[5] H03G 3/20
U.S. Cl. 330—279 7 Claims



1. An audio system for amplifying an audio signal comprising:
a main chassis;
a remote amplifier stage;
a mute control line coupling said main chassis and said remote amplifier stage; and
at least one audio line coupling said audio signal from said main chassis to said remote amplifier stage;
said main chassis including:
preamplifier means for amplifying said audio signal;
mute control means coupled to said mute control line for driving said mute control line with a first voltage to cause a muted state of said audio system and for driving said mute control line with a second voltage to cause an unmuted state of said audio system;
voltage comparator means coupled to said mute control

line for comparing a voltage present on said mute control line with a reference voltage and generating a gain reduction signal depending on the result of said comparison; and

gain control means coupled to said preamplifier means and to said voltage comparator means for reducing the magnitude of said audio signal at the output of said preamplifier means in response to said gain reduction signal;

said remote amplifier stage including:

power amplifier means coupled to said preamplifier means for amplifying said audio signal by a substantially fixed gain;

amplifier muting means coupled to said power amplifier means and to said mute control line for muting an audio output of said power amplifier means in response to said first voltage being present on said mute control line; and

clip detector means coupled to said power amplifier means and said mute control line for driving said mute control line with a third voltage whenever said fixed gain amplification of said audio signal results in signal clipping, said reference voltage having a magnitude between said second and third voltages.

4,978,927

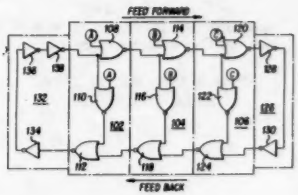
PROGRAMMABLE VOLTAGE CONTROLLED RING OSCILLATOR

Kristen A. Hausman, Delray Beach, Fla.; Gene J. Gaudenzi, Purdys, N.Y.; Joseph M. Mosley, Boca Raton, Fla., and Susan L. Tempest, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 8, 1989, Ser. No. 433,260

Int. Cl.[5] H03B *5/00*

U.S. Cl. 331—57 **8 Claims**



1. A programmable ring oscillator, comprising in combination:

a first circuit section including first, second and third gates, a first input of said first gate being coupled to a first input of said second gate, the output of said second gate being coupled to a first input of said third gate;

a second circuit section including fourth, fifth and sixth gates, the output of said first gate being coupled to a first input of said fourth gate and to a first input of said fifth gage, the output of said fifth gate being coupled to a first input of said sixth gate, the output of said sixth gate being coupled to a second input of said third gate;

a first circuit coupled between the output of said fourth gate and a second input f said sixth gate; and

a second circuit coupled between the output of said third gate and said first input of said first gate, such that said programmable ring oscillator has first, second and third selectable oscillator signal paths, said first path being through said first and fourth gates, said first circuit, said sixth and third gates and said second circuit; said second path being through said first, fifth, sixth and third gates, and said second circuit; said third path being through said second and third gates and said second circuit.

4,978,928

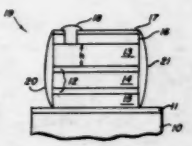
HIGH FREQUENCY, FREQUENCY MULTIPLIER USING PARALLEL GUNN DIODES

Mario Ancona, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 30, 1990, Ser. No. 501,571

Int. Cl.[5] H03B *5/12*

U.S. Cl. 331—107 G **10 Claims**



1. A Gunn-effect frequency multiplier device comprising:

a plurality of semiconducting elements capable of supporting Gunn-effect domains;

a cathode and an anode, common to all said semiconducting elements, connecting said elements in parallel; and

means for sequentially creating a dipole domain in each of said semiconducting elements during a time substantially less than or equal to the shortest transit time of a dipole domain between said cathode and said anode for any of said semiconducting elements.

4,978,929

OSCILLATOR FOR SUPPLYING A GAS DISCHARGE DEVICE

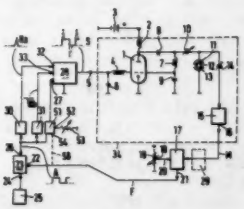
Karl-Heinz Knobbe, Ellerbek, Fed. Rep. of Germany, assignor to Herfurth GmbH, Hamburg, Fed. Rep. of Germany

Filed Dec. 20, 1989, Ser. No. 453,914

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1988, 3843210

Int. Cl.[5] H03B *5/10;* **H03L** *5/00;* **H01S** *3/097*

U.S. Cl. 331—173 **21 Claims**



1. A circuit for supplying electrical pulses to a gas discharge path, said circuit comprising:

an oscillator circuit (1) having a power terminal adapted to be connected to an unregulated voltage source (3) for receipt of operating voltage therefrom, an input terminal (5) for receipt of triggering pulses (S), and an output terminal for providing an oscillator signal;

output means (11, 13) coupled to said oscillator circuit output terminal and adapted to be coupled to the gas discharge path (12) for application of the oscillator signal thereto; a first control circuit (15–31) coupled to said oscillator output terminal for generating drive pulses (A) having a pulse width which varies from a preset width as a function of the variation of the oscillator signal from a predetermined value; and

a grid control circuit (28) coupling the first control circuit to the oscillator circuit, said grid control circuit responsive

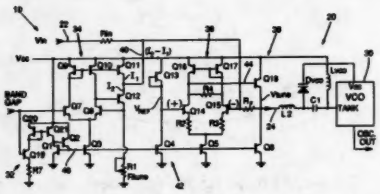
to the drive pulses for applying triggering pulses to said oscillator circuit to trigger operation thereof.

4,978,930

LOW VOLTAGE VCO TEMPERATURE COMPENSATION

Richard R. Suter, Beaverton, Oreg., assignor to AT&E Corporation, San Francisco, Calif.

Filed Jul. 18, 1989, Ser. No. 381,436
Int. Cl.[5] H03B 5/04; H03L 1/02
U.S. Cl. 331—176 **12 Claims**



1. A method of temperature compensating a voltage-controlled varactor oscillator which oscillates at a frequency proportional to a control signal voltage, said varactor oscillator having a predetermined temperature drift, the method comprising:

generating said control signal voltage, the magnitude of which is proportional to a desired frequency of oscillation,

providing a temperature dependent current;

offsetting said control signal voltage by an amount proportional to said temperature dependent current to form a tuning signal having a temperature dependent voltage; and

varying said temperature dependent current in response to temperature so that said tuning signal voltage varies to compensate for said oscillator temperature drift

said step of providing a temperature dependent current including:

providing a PTAT current proportional to temperature;

providing a temperature stable current; and

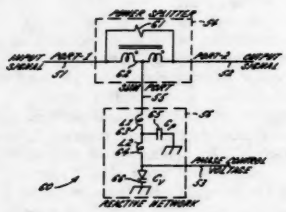
subtracting the PTAT current from the temperature stable current to form an offset current, whereby said offset current is inversely proportional to temperature.

4,978,931

TUNABLE PHASE SHIFTER HAVING WIDE INSTANTANEOUS BANDWIDTH

Stuart L. Carp, Menlo Park, and Allen P. Edwards, Palo Alto, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 8, 1989, Ser. No. 363,247
Int. Cl.[5] H03H 5/00
U.S. Cl. 333—28 R **17 Claims**



1. A phase shifter comprising:

an input port for receiving an input signal within a range of frequencies between a first frequency and a second frequency greater than said first frequency;

an output port for providing an output signal in response to said input signal, said output signal being shifted in phase from said input signal;

a power splitter having an input port connected to said input port of said phase shifter, an output port connected to said output port of said phase shifter, and a sum port; and

a reactive network comprising:

an input/output port connected to said sum port of said power splitter;

a control lead for receiving a control input signal indicative of the desired phase shift of said output signal relative to said input signal;

means for providing one or more variable reactances, the reactance of said variable reactances being determined in response to said control input signal, each of said variable reactances providing an associated pole and zero;

means for providing one or more poles of the reflection coefficient of said reactive network in addition to said poles provided by said one or more variable reactances; and

means for providing one or more zeros of the reflection coefficient of said reactive network in addition to said zeros provided by said one or more variable reactances,

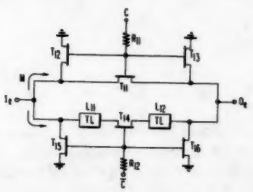
wherein said one or more poles and said one or more zeros move over frequency in a manner such that the effect of said one or more variable reactances, said one or more poles, and said one or more zeros track over frequency to provide a substantially constant group delay between said output and said input signals.

4,978,932

MICROWAVE DIGITALLY CONTROLLED SOLID-STATE ATTENUATOR HAVING PARALLEL SWITCHED PATHS

Ramesh K. Gupta, and Bernard D. Geller, both of Rockville, Md., assignors to Communications Satellite Corporation, Clarksburg, Md.

Filed Jul. 7, 1988, Ser. No. 216,921
Int. Cl.[5] H01P 1/22
U.S. Cl. 333—81 R **29 Claims**



6. An attenuator comprising:

a reference path for carrying an electrical signal from an input terminal to an output terminal of the attenuator, said reference path including at least one transistor therein for carrying the electrical signal while operating in a passive mode when enabled, and two shunt transistors connected between ground and said reference path with said at least one transistor in said reference path connected therebetween;

an attenuation path for carrying the electrical signal from the input terminal to the output terminal and providing a predetermined relative attenuation of the electrical signal, said attenuation path including at least one transistor therein for carrying the electrical signal while operating in a passive mode when enabled, and two shunt transistors connected between ground and said attenuation path with

said at least one transistor of said attenuation path connected therebetween; and

control means for selectively enabling one of the at least one transistor in said reference path and the at least one transistor in said attenuation path for signal transmission while leaving the other one of the at least one transistors in said reference and attenuation paths disabled.

4,978,933

WIDEBAND MICROWAVE HYBRID CIRCUIT WITH IN-PHASE OR PHASE-INVERTED OUTPUT SIGNALS

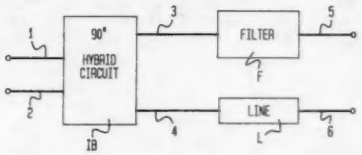
Franco Marconi, Monza, Italy, assignor to Siemens Telecomunicazioni S.p.A., Milan, Italy

Filed Sep. 29, 1988, Ser. No. 250,893

Claims priority, application Italy, Oct. 1, 1987, 22103 A/87

Int. Cl.[5] H01P *5/16*

U.S. Cl. 333—117 **9 Claims**



1. A wide-band microwave hybrid circuit, comprising:

a wide-band hybrid circuit, having first and second input terminals for having an input signal applied thereat, and first and second output terminals, for producing respective signals at said output terminals mutually phase shifted by 90 degrees over a wide frequency band;

a half-wave line section having a first phase characteristic varying over the wide frequency band, said line section being one half-wave length long at a center frequency of said wide frequency band, a first end of said half-wave line section being coupled to the first output terminal of said wide-band hybrid circuit; and

a wide-band filtering network, with input and output terminals, having a second phase characteristic varying over the wide frequency band between said input and output terminals of said wide-band filtering network, the input terminal of said wide-band filtering network being coupled to the second output terminal of said wide-band hybrid circuit; wherein:

said second phase characteristic exhibits a signal phase shift between said input and output terminals of said wideband filtering network of −90 degrees at the center frequency of said wide frequency band, varying over the frequency band like said first phase characteristic in said wide frequency band, and causes a phase-difference between the output terminal of said wide-band filtering network and a second end of said half-wave line section wherein said phase difference is substantially flat over a range of frequencies in said wide frequency band.

4,978,934

SEMI-FLEXIBLE DOUBLE-RIDGE WAVEGUIDE

Saad M. Saad, Willowbrook, Ill., assignor to Andrew Corportion, Orland Park, Ill.

Filed Jun. 12, 1989, Ser. No. 365,598

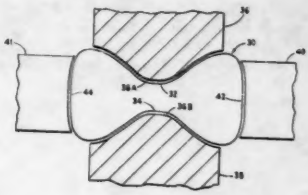
Int. Cl.[5] H01P *3/14, 3/123*

U.S. Cl. 333—241 **11 Claims**

4. A double-ridge waveguide having a cross-sectional contour defined about major and minor axes u and v, respectively, by the polar equation

$$r^{2p}-2ar^{p}\cos 2\Theta+a^{2}=b^{2}$$

where r and Θ are variables, r being the radial distance between any given point on said contour and the point of origin and Θ being the angle between the major axis and the radial line along which said given point is defined on said contour, a



and b are constants defined in terms of said major and minor axes u and v as

$$a=\frac{u^{p}-v^{p}}{2^{p}+1}\quad b=\frac{u^{p}+v^{p}}{2^{p}+1},$$

and the exponent p has a value greater than two.

4,978,935

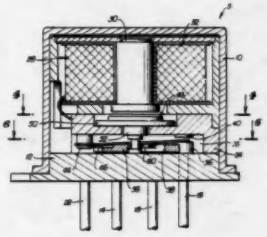
ELECTROMAGNETIC RELAY

Jerzy Hoffman, 306 Bora Bora Way, Marina Del Rey, Calif. 90292, and Krzysztof J. Ciezarek, 15335 Magnolia Blvd., #212, Sherman Oaks, Calif. 91403

Filed Jan. 25, 1988, Ser. No. 147,524

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—121 **11 Claims**



1. An electromagnetic relay, comprising:

(a) an input terminal;

(b) a first output terminal;

(c) a second output terminal;

(d) a ferro-magnetic armature being movable between a first position and a second position;

(e) an electrically conductive contact reed coupled to the armature and being movable to contact the second output terminal, said reed being electrically coupled to the input terminal;

(f) at least one permanent magnet; and

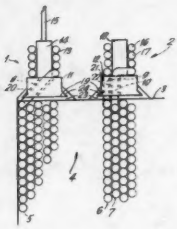
(g) an electromagnet, the armature being disposed between the permanent magnet and the electromagnet, the permanent magnet being positioned to attract the armature to the first position, and the electromagnet being positioned to attract the armature against the attraction of the permanent magnet to the second position to thereby move the contact reed to contact the second output terminal when activated.

4,978,936

SUPERCONDUCTING MAGNETIC COIL ELEMENT HAVING TERMINALS BONDED TO THE COIL BODY

W. Denis Markiewicz; Gary Ciancetta, both of Schenectady, and Philip Jonas, Albany, all of N.Y., assignors to Intermagnetics General Corporation, Guilderland, N.Y.

Filed Mar. 3, 1988, Ser. No. 163,527
Int. Cl.[5] H01F 7/22
U.S. Cl. 335—216 11 Claims



1. A terminal for providing an electrical connection to at least one conductor end portion extending from the surface of an impregnated superconductor magnetic element comprising in combination:

a terminal base member;

a coil body contacting face, a portion of said coil body contacting face adapted for electrical connection, and at least one opening for extending through said contacting face for accommodating a conductor;

bonding means integrally retaining said base member to less than a portion of said contacting face which is less than the entire surface thereof, thereby reducing stresses at the interface; and

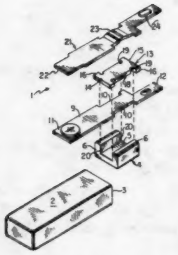
an electrical connection for said conductor end portion.

4,978,937

SPACER FOR THERMOSTAT STACK

Omar R. Givler, N. Canton, Ohio, assignor to Portage Electric Products, Inc., North Canton, Ohio

Filed Dec. 4, 1989, Ser. No. 445,396
Int. Cl.[5] H01H 37/04, 37/52
U.S. Cl. 337—372 7 Claims



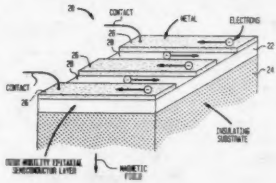
1. A thermostatic switch having at least one bimetal member responsive to temperature variations, a first contact movable in response to movement of the bimetallic member, a second member having a second contact adjacent to, and contactable with, the first contact, an insulative separator having a central portion and a plurality of tabs at ends thereof, placed between the first and second members, a plurality of inner corners formed at each junction of a tab with the central portion, a stacking block, having a recess sized for accepting placement of the first and second members and the central portion of the separator therein, the improvement comprising relief means provided at each inner corner of the separator, wherein said relief means limits contact between the inner corners of the separator and edges of the stacking block to avoid stress concentration which would cause breakage of the separator.

4,978,938

MAGNETORESISTOR

Dale L. Partin, Sterling Heights; Joseph P. Heremans, Troy, and Donald T. Morelli, Walled Lake, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 289,646, Dec. 23, 1988, abandoned. This application Oct. 25, 1989, Ser. No. 426,245
Int. Cl.[5] H01L 43/00
U.S. Cl. 338—32 R 17 Claims



1. A magnetoresistive sensor providing unamplified electrical output changes of the order of one volt in response to changes in an applied magnetic field even when exposed up to temperatures over 220° C., said magnetoresistive sensor comprising:

a substantially electrically insulating monocrystalline substrate having a thermal expansion characteristic close to that of indium arsenide;

a material forming the surface of said substrate that has a crystal lattice constant close to that of a semiconductive material to be deposited onto said surface;

a monocrystalline thin film of said semiconductive material disposed on said substrate surface, said thin film having inner and outer surfaces;

said monocrystalline thin film being of a semiconductive material having only a moderate average current carrier density and moderate average current carrier mobility, and a band gap of at least 0.36 electron volt;

said monocrystalline semiconductive thin film including a substantially rectangular sensing area for sensing a magnetic field applied perpendicularly to said film surfaces, said sensing area being defined as the entire area of said film disposed between the shorter, if they are not of equal length, of two parallel highly conductive portions in low electrical resistance contact with film portions adjacent the film outer surface;

said rectangular sensing area having two long edges of substantially equal length and two short edges of substantially equal length in which the length of the short edges is about 10% to 60% of the length of the long edges, and one of said two parallel conductors extends along the length of each long edge; and

an accumulation layer artificially induced in said thin film extending across said sensing area and disposed adjacent a surface of said thin film, where said current carriers can preferentially flow between said highly conductive portions contacting opposed edges of said sensing area;

effective to provide an apparent increase in carrier mobility and concentration in said semiconductive material, an apparent reduction in thickness of said film, and an actual

improvement in the magnetic sensitivity of said film and in temperature insensitivity of the magnetic sensitivity of said film.

4,978,939

SETTABLE RESISTOR

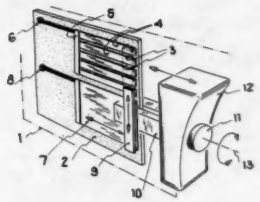
Heinrich Zeitvogel, Ingolstadt, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Apr. 28, 1989, Ser. No. 344,977

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1988, 3821562

Int. Cl.[5] H01C *10/38*

U.S. Cl. 338—176 **21 Claims**



1. A settable resistor particularly for hand switches of power tools, comprising a resistance path array, a contact piece, the resistance path array and the contact piece being in contact and independently adjustable relative to one another in a longitudinal direction without motion in a transverse direction of said resistance path array, and an adjusting device which causes said contact piece and/or said resistance path array to be additionally independently adjustable transverse to the longitudinal direction of said resistance path array without motion in the longitudinal direction, and the contact piece and the resistance path array being simultaneously independently adjustable in both the longitudinal and transverse directions.

4,978,940

AUTOMOBILE SECURITY SYSTEM

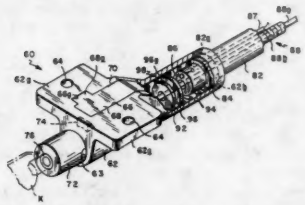
Neil B. Kaplan, Cohasset, Mass., assignor to Boston Auto Security, Inc., Hingham, Mass.

Continuation of Ser. No. 944,665, Dec. 19, 1986, Pat. No. 4,792,784. This application Dec. 19, 1988, Ser. No. 286,309

The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.

Int. Cl.[5] B60R *25/00*

U.S. Cl. 340—426 **3 Claims**



1. Vehicle security apparatus, comprising:

(A) a tubular housing having a housing bore;

(B) a lock barrel having a retractable latch, and a rotary lock cylinder for controlling said latch, said barrel being slidably received in said housing bore and movable between an unlocked extended position, and a locked retracted position within said housing bore;

(C) a spring positioned in said housing bore and which biases said barrel toward its extended position; and

(D) detent means for establishing said extended and retracted positions of said barrel by engagement with said latch; said detent means including

(i) a first detent section that engages said latch when said barrel is extended a first, appreciable distance within said housing bore to its extended position,

(ii) a second detent section that engages said latch when said barrel is extended a second, lesser distance within said housing bore to its retracted position, and

(iii) a third detent section disposed adjacent said latch when said barrel is extended a third distance within said housing bore, said third distance being different from said first and second distances, and

(iv) wherein said third detent section and said latch are configured for enabling rotation of said barrel within said housing when said barrel is at said third distance so that said barrel assumes a release position in which said latch no longer engages said detent means, whereby said barrel can be pulled entirely out of said housing.

4,978,941

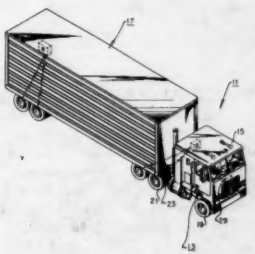
LOW TIRE PRESSURE DETECTOR

Daniel M. Brown, Grand Prairie, Tex., assignor to Air Chex, Inc., Arlington, Tex.

Continuation-in-part of Ser. No. 217,760, Jul. 11, 1988, abandoned. This application Oct. 5, 1989, Ser. No. 417,463

Int. Cl.[5] B60C *23/00*

U.S. Cl. 340—447 **20 Claims**



1. A tire pressure monitoring system for a vehicle having a plurality of tires and having an operator's cab comprising:

a. a plurality of tire pressure sensing means for sensing pneumatic pressure within said tires; each of said tire pressure sensing means being in communication with its respective tire and operable to sense the pneumatic pressure therewithin; said tire pressure sensing means being perpendicular to the plane of said tire such that it is insensitive to false alarms such as bounce or centrifugal force by said tire;

b. a plurality of transmitters connected, respectively and responsively with a plurality of said tire pressure sensing means, and adapted to be energized when any one of said tire pressure sensing means indicates a low pneumatic pressure within one of the tires;

c. at least one receiver responsively disposed near enough to said transmitters to be responsive to said transmitters so as to be energized by said transmitters when one of said transmitters is energized by its one tire pressure sensing means; and

d. a warning means disposed in the operator's cab for conveying a warning to an operator when a low pressure is sensed within one of said tires; said warning means being

electrically connected with said receiver so as to be energized when said receiver is energized.

4,978,942

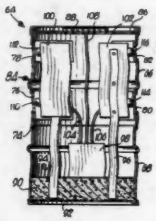
DISGUISED BEAM-BREAK SECURITY SYSTEM

Richard L. Bruce, Rte. 5, Box 60, Lawrence, Kans. 66046

Filed Jun. 30, 1989, Ser. No. 373,410

Int. Cl.[5] G08B 13/18

U.S. Cl. 340—556 10 Claims



1. A security monitoring station comprising:

means for handling an electromagnetic beam directed on a beam path;

means for supplying electrical power to said beam-handling means; and

a housing surrounding said beam-handling and power supply means, said housing including structure presenting the appearance of an industrial container, said structure defining at least one opening for the passage of said electromagnetic beam along said path therethrough, said housing including a bottom and anchor means overlying said bottom within said housing.

4,978,943

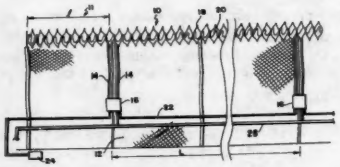
METHOD AND APPARATUS FOR MAKING A VIBRATION-RESPONSIVE INTRUSION DETECTION BARRIER

John W. Mainiero; Michael R. Mainiero, both of Sandy Hook, Conn., and Thomas J. Heinlein, Ronkonkoma, N.Y., assignors to MRM Security Systems, Inc., Waterbury, Conn.

Continuation-in-part of Ser. No. 274,414, Nov. 18, 1988, Pat. No. 4,906,975. This application Dec. 18, 1989, Ser. No. 452,227

Int. Cl.[5] G08B 13/12

U.S. Cl. 340—566 25 Claims



1. A method for continuously forming an intrusion detection barrier, said method comprising the steps of:

providing a barbed tape having an elongated central supporting portion and a plurality of barb clusters extending unitarily therefrom;

forming a longitudinally extending channel in said central supporting portion;

feeding an elastomeric filler material into the channel;

feeding an elastomeric filler

placing an elongated vibration-sensitive cable in the channel; and

forming the central supporting portion of the barbed tape around the vibration-sensitive cable and the filler material, whereby the filler material prevents accumulation of moisture between the cable and the barbed tape and enhances the transmission of vibrations to the cable, with the steps of forming the channel, feeding the filler, placing the cable in the channel and forming the central supporting portion around the cable being carried out substantially simultaneously at a plurality of spaced locations along the barbed tape.

4,978,944

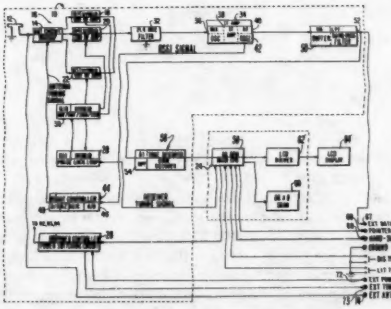
PAGING RECEIVER WITH DYNAMICALLY PROGRAMMABLE CHANNEL FREQUENCIES

Andrew A. Andros, Spring, Tex., and Thomas J. Campana, Chicago, Ill., assignors to Telefind Corporation, Coral Gables, Fla.

Continuation of Ser. No. 110,664, Oct. 20, 1987, Pat. No. 4,849,750. This application Jul. 17, 1989, Ser. No. 380,382

Int. Cl.[5] H04Q 7/00

U.S. Cl. 340—825.440 25 Claims



1. A paging receiver programmable by a plurality of different commands with each command defining a different operation to be performed by the paging receiver upon decoding the command and being transmitted to the paging receiver by RF transmission with each command including a paging receiver identification code with identifies a paging receiver to receive the RF transmission, and a command field which encodes one of the commands comprising:

a tuner for receiving RF transmissions; and

a controller, coupled to the tuner, for decoding each command field and controlling execution of an operation specified by the command; and wherein

one of the commands is a channel programming command which causes the programming of at least one channel stored within a channel memory of the paging receiver to be received by the paging receiver in an area remote from a location identified by an area designation code of the paging receiver identification code stored by the paging receiver.

4,978,945

ALARM SUPPRESSING SYSTEM IN AIRCRAFT COLLISION AVOIDANCE SYSTEM

Chuhei Funatsu, Kanagawa, Japan, assignor to Toyo Communication Equipment Co., Japan

Continuation-in-part of Ser. No. 65,217, Jun. 5, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 373,205

Int. Cl.[5] G01S 9/56

U.S. Cl. 340—961 5 Claims

1. An alarm suppressing system for an aircraft collision avoidance system which has a function of determining whether or not a subject aircraft is in danger of colliding with other aircraft and which generates an alarm when it has determined that the subject aircraft is in danger of colliding with another

aircraft, through utilization of a response signal received from said other aircraft, said alarm suppressing system comprising a filtering circuit and said collision avoidance system comprising:

a receiver for receiving at least said response signal from said other aircraft;

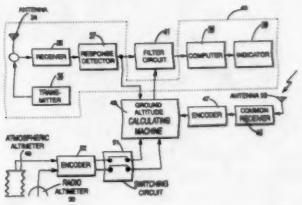
a first encoder for encoding said received response signal into a required signal;

an altitude information detector for detecting altitude information of said subject aircraft;

a second encoder for encoding the output signal of said altitude information detector into a required signal;

a first comparator for comparing the outputs of said first and second encoders;

a collision avoidance system logic circuit which receives the output of said receiver via filtering circuit of said alarm



suppressing system and determines whether or not said subject aircraft is in danger of midair collision with said other aircraft in accordance with said output of said receiver;

said alarm suppressing system comprising:

a second comparator for comparing the output of said first comparator and the output of said second encoder;

said filtering circuit which is supplied with the output of said receiver and is controlled by the output of said second comparator;

wherein when an altitude difference between said subject aircraft and said other aircraft is equal to the altitude of said subject aircraft and said other aircraft is at an altitude lower than said subject aircraft, it is determined that said subject aircraft is staying on the ground, and the generation of an alarm is prevented on the basis of said response signal received from said other aircraft.

4,978,946

PERSONAL SECURITY COMMUNICATION SYSTEM

Ken Nordholm, and H. I. Eyers, both of Vancouver, Canada, assignors to Talkie Tooter (Canada) Ltd., Vancouver, Canada

Continuation-in-part of Ser. No. 84,959, Aug. 13, 1987, Pat. No. 4,884,067. This application Mar. 21, 1989, Ser. No. 326,716

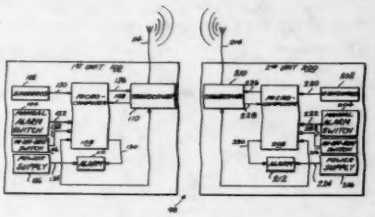
Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—573 **28 Claims**

1. A personal security communication system configured to operate as a buddy system, said system comprising:

(a) a first portable unit for producing a first status signal and receiving a second status signal, said first portable unit transmitting said first status signal as a radio frequency carrier signal modulated with data messages, said first portable unit producing an alarm when said first status signal includes emergency alarm information, and said first portable unit also producing an alarm when said second status signal includes emergency alarm information, said first portable unit further producing an alarm when said second status signal is not received for a predetermined period of time; and,

(b) a second portable unit for producing said second status signal and receiving said first status signal, said second portable unit transmitting said second status signal as a radio frequency carrier signal modulated with data messages, said second portable unit producing an alarm when said first status signal includes emergency alarm condition information and said second portable unit also producing an alarm when said second status signal includes emergency alarm condition information, said second portable unit further producing an alarm when said first status signal is not received for a predetermined period of time.



4,978,947

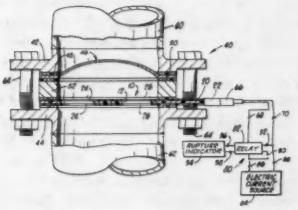
RUPTURABLE FLUID FLOW INDICATOR

Michael C. Finnegan, Limerick, Ireland, assignor to BS&B Safety Systems, Inc., Tulsa, Okla.

Filed May 25, 1989, Ser. No. 342,960

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—611 **11 Claims**



1. A rupture disk assembly which provides an immediate indication of when a rupture disk in the assembly ruptures or fails whereby pressurized fluid flows therethrough comprising:

a rupture disk adapted to be clamped across a fluid flow passageway and to rupture when a predetermined fluid pressure is exerted thereon;

an annular spacer positioned on the downstream side of said rupture disk;

a fluid flow indicator positioned on the downstream side of said annular spacer, said indicator including:

a rupturable member adapted to be clamped across a fluid flow passageway and having a plurality of openings formed therein which define lines of weakness therein; and

an electric current conductor adapted to be electrically connected in an alarm circuit attached to said rupturable member and positioned thereon whereby when said rupturable member ruptures along said lines of weakness as a result of fluid flow force or fluid pressure exerted thereon, said conductor is also ruptured;

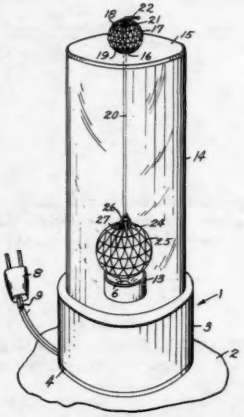
means for clamping said rupture disk, said annular spacer and said fluid flow indicator across said fluid flow passageway attached thereto and to said passageway; and

an alarm circuit for providing an immediate indication when said electric current conductor is ruptured connected to said conductor.

4,978,948
COMBINED EARTHQUAKE SENSOR AND NIGHT LIGHT

Lynda S. Samen, 73.373 C.C. Dr., Ste. 704, Palm Desert, Calif. 92260

Filed Mar. 13, 1990, Ser. No. 492,467
Int. Cl.[5] G08B 21/00; F21V 33/00
U.S. Cl. 340—690 8 Claims



1. In a combined earthquake sensor and night light comprising a base member having a top and bottom, said bottom adapted to rest on a support surface, said top having a light reflective surface, a light source centrally mounted on said top reflective surface, a transparent cylinder mounted on said top base member in coaxial relationship with said light source, an elongated elastic member coaxially suspended at one end from a support means attached to a top portion of said transparent cylinder, and a light scattering means freely suspended from the other end of said elongated elastic member to lie above said light source whereby vibrations transmitted to said base member from said support surface cause relative movement of said light scattering means giving a visual indication of said vibrations.

4,978,949
LOCKING MECHANISM AND SUPPORT LEGS FOR REMOVABLE DISPLAY ASSEMBLY

Matthew A. Herron, and Dennis J. Boyle, both of Menlo Park, Calif., assignors to Dynabook Technologies Corporation, Westlake Village, Calif.

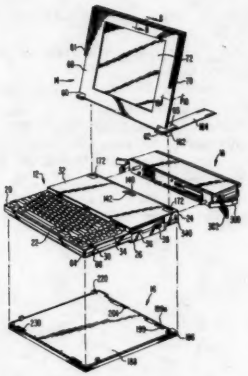
Filed Mar. 6, 1989, Ser. No. 319,178
Int. Cl.[5] G09G 3/02
U.S. Cl. 340—711 21 Claims

1. A computer apparatus, comprising:

a chassis having a keyboard;

a display electrically connected to, and mounted on, said chassis; and

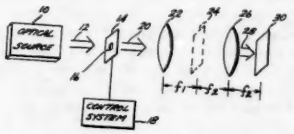
releasable lock means for removably securing said display to said chassis, said display including a base and a housing pivotably connected to said base, and said lock means comprising a pair of locking members rotatable into and out of a locking position, each being disposed at opposite ends of said base and operating levers fixedly secured to said locking members for effecting movement thereof to and from their locking position.



4,978,950
GREY-SCALE REPRESENTATION USING BINARY SPATIAL LIGHT MODULATORS IN COHERENT OPTICAL PROCESSOR

C. David Capps, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 14, 1989, Ser. No. 380,103
Int. Cl.[5] H04N 1/46; G09G 3/20
U.S. Cl. 340—783 9 Claims



1. In a coherent optical processor comprising means for producing a coherent input beam of light, spatial modulation means for receiving the input beam and for spatially modulating the input beam at a plurality of spatially separate image pixels to produce a modulated beam having the image pixels spatially encoded thereon, and a transform lens for receiving the modulated beam, the improvement wherein the spatial modulation means comprises:

means for dividing the input beam into N sub-beams directed along N respective sub-beam paths;

N binary spatial light modulators, each binary spatial light modulator comprising an array of sub-pixels and being positioned in one or the sub-beam paths so as to receive the sub-beam and convert it into a modulated sub-beam, each sub-pixel either blocking or passing a portion of the sub-beam, one sub-pixel of each of the N binary spatial light modulators corresponding to each image pixel;

means for combining the modulated sub-beams to produce the modulated beam and for directing the modulated beam onto the transform lens, the sub-beams being combined such that for each image pixel, light that has passed through the N corresponding sub-pixels is spatially combined;

the optical path length from input beam to modulated beam being the same along each sub-beam path; and

weighting means for modifying the intensity of the light following the N sub-beam paths by selected weighting values, the weighting values forming a series in which each of N−1 weighting values differs from the preceding weighting value by a factor of 4.

4,978,951

MATRIX DISPLAY DEVICES WITH INTERCONNECTED DIODE RING CIRCUIT PROVIDING FAULT TOLERANCE

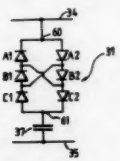
Alan G. Knapp, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 13, 1989, Ser. No. 297,820

Claims priority, application United Kingdom, Feb. 24, 1988, 8804326

Int. Cl.[5] G09G 3/36

U.S. Cl. 340—784 **19 Claims**



1. A matrix display device comprising a plurality of row and column address conductors, a plurality of picture elements each comprising an electro-optical display element connected in series with an associated two terminal non-linear resistance device between a row conductor and a column conductor, said non-linear resistance device comprising a diode ring type circuit providing first and second conduction paths in parallel between the two terminals, each of which paths exhibits a threshold characteristic and contains at least three series-connected diode elements arranged to allow current flow through the display element in respective opposite directions, and means connecting at least one diode element intermediate the first and last diode elements of the first conduction path, which first path allows current flow through the display element in one direction, such that said at least one diode element forms a part of the second conduction path intermediate the first and last diode elements of the second conduction path whereby the second path is capable of allowing current flow through the display element in the opposite direction.

4,978,952

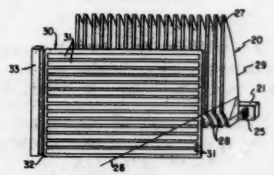
FLAT SCREEN COLOR VIDEO DISPLAY

Dean S. Irwin, San Diego, Calif., assignor to Collimated Displays Incorporated, New York, N.Y.

Filed Feb. 24, 1989, Ser. No. 315,734

Int. Cl.[5] G09F 9/00; G02B 5/14

U.S. Cl. 340—795 **53 Claims**



1. A video display having a display area of a width W and a height H, comprising:

light producing means for producing a column of light which substantially spans the height of the display area and is substantially narrower than the width thereof, said light producing means including light source means for emitting the light and including means for directing and reflecting the light to form said column;

shutter means arranged so that the light produced is incident thereon for selectively controlling transmission of at least a portion of the incident light, said shutter means having a plurality of vertically aligned, elongated horizontal strip apertures selectively controllable to transmit and block said light; and

sweeping means for sweeping the light produced substantially across the width of the display area.

4,978,953

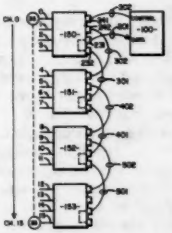
DEVICE FOR MONITORING MULTIPLE DIGITAL DATA CHANNELS

Douglas Hauge, Coon Rapids, Minn., assignor to Technology 80, Inc.

Filed Nov. 22, 1988, Ser. No. 275,099

Int. Cl.[5] H04B 17/00

U.S. Cl. 340—825.16 **7 Claims**



1. An apparatus for switching any of a plurality of data channels, each of said data channels comprising a plurality of signal lines, into a device for monitoring said signal lines, comprising

(a) a plurality of modules, each module having an interconnection matrix and channel selection logic therein to permit switching of any of four data channels to a single data channel output;

(b) means for connecting each of said modules to four data channels and means for connecting each of said four data channels' plurality of signal lines to said interconnection matrix;

(c) means for connecting each of said modules' single data channel output to said device for monitoring said signal lines; and

(d) means for connecting said plurality of modules in series connection with said device for monitoring said signal lines, wherein each of said modules further comprises module selection logic having means for selecting said module controlled by said modules' serial position relative to said device for monitoring.

4,978,954

NON-CONTACT TYPE POTENTIOMETER EMPLOYING A TRIANGULAR WAVE ENCODER

Kazumasa Koike, Iida, Japan, assignor to Tamagawa Seiki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 10, 1989, Ser. No. 336,597

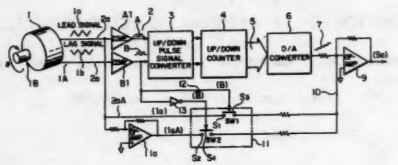
Claims priority, application Japan, Dec. 1, 1988, 63-302179

Int. Cl.[5] H03M 1/22

U.S. Cl. 341—1 **1 Claim**

1. A non-contact type potentiometer making use of a triangular wave encoder comprising

a triangular wave encoder for outputting a triangular wave signal consisting of a LEAD signal and a LAG signal having phases different from each other, first and second comparators for waveforming respectively said LEAD and LAG triangular wave signals into a corresponding pair of rectangular wave signals A and B, and up/down signal converter for converting each of said rectangular wave signals into up/down directive pulses, an up/down counter for receiving said directive pulses and outputting an absolute digital signal, a D/A converter for converting said absolute digital signal into an analog position step signal, an analog switch control circuit having a first switch and a second switch coupled respectively to be supplied with said LEAD signal and with a $\overline{\text{LEAD}}$ signal



inverted from said LEAD signal while being coupled to an output of said second comparator to be turned on or off by being supplied with both said rectangular wave signal $\overline{B}$ obtained from said LAG signal and with a rectangular wave signal $\overline{\overline{B}}$ inverted from said rectangular wave signal $\overline{B}$, and an operational amplifier for summing together the output signal from said analog switch control circuit and said analog position step signal, wherein said switches are controlled responsive to the high level of said rectangular wave signals $\overline{B}$ and $\overline{\overline{B}}$ to control said switches to supply said LEAD signal or said $\overline{\text{LEAD}}$ signal to be summed with said analog position step signal to produce a linear analog potentiometer output signal from said operational amplifier.

4,978,955

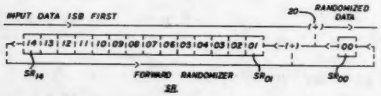
DATA RANDOMIZING/DE-RANDOMIZING CIRCUIT FOR RANDOMIZING AND DE-RANDOMIZING DATA

Jones V. Howell, Newport Beach, Calif., assignor to Archive Corporation, Costa Mesa, Calif.

Filed Nov. 9, 1989, Ser. No. 435,002

Int. Cl.[5] H03N 7/26

U.S. Cl. 341—109 **22 Claims**



1. A data randomizing/de-randomizing circuit for randomizing data or de-randomizing previously randomized data according to a randomization scheme utilizing an irreducible generator polynomial which operates on a serial bit stream of words of data which is supplied to said circuit in a format, either LSB or MSB first, different from the format according to which the data was previously randomized or will be subsequently de-randomized, said circuit comprising:

(a) shift register means arranged to generate said irreducible generator polynomial;

(b) means for shifting the contents of said shift register means in response to a clock signal in a given direction;

(c) means for exclusively ORing the contents of a bit in said shift register means with a bit in said bit stream; and

(d) means for periodically setting the state of said shift register means a predetermined number of states in a direction effectively the opposite to which said shift register means propagates in response to said shifting means, said setting means being effective once every N states, where N equals the number of bits in a word in said serial bit stream and wherein said predetermined number of states equals 2N−1.

4,978,956

APPARATUS FOR DIGITAL CONVERSION AND PROCESSING OF ANALOG INERTIAL VELOCITY OR ACCELERATION SIGNALS

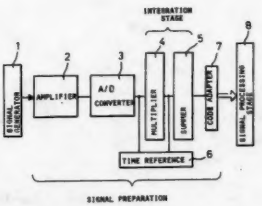
Alexander Berresheim, Brunnthal, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Feb. 3, 1989, Ser. No. 306,403

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803872

Int. Cl.[5] H03M 1/12

U.S. Cl. 341—155 **5 Claims**



1. Apparatus for the conversion of an analog inertial velocity or acceleration signal to a digital signal and the processing of the resultant digital signal, comprising:

input means responsive to sensor means, the sensor means detecting forces acting upon a seismic mass, the means responsive to the sensor means generating an analog signal proportional to velocity or acceleration of the mass;

amplifier means for receiving said analog signal and amplifying said signal;

analog to digital converter means coupled to the amplifier means for converting said amplified analog signal to a digital signal;

integration means comprising multiplier means and summing means, said integration means forming a product P by multiplying the digital signal from the analog to digital converter means by a constant and adding the product of a previous multiplication operation, the forming operation continuing continuously over the integration period;

clock means for providing an integration period and sampling period to the integration means and the analog to digital converter means, respectively, and coupled respectively to the integration means and the analog to digital converter means; and

matching means for matching the digital format of product P to the digital format desired for the output.

4,978,957

HIGH-SPEED ANALOG-TO-DIGITAL CONVERTER

Masao Hotta, Hanno; Toshihiko Shimizu, and Yoshito Nejime, both of Hachioji, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 6, 1990, Ser. No. 475,799

Claims priority, application Japan, Mar. 10, 1989, 01-059430

Int. Cl.[5] H03M 1/36

U.S. Cl. 341—156 **19 Claims**

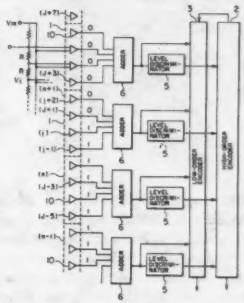
1. An analog-to-digital converter comprising:

means including a plurality of series-connected resistors for providing a plurality of reference signals corresponding to a desired resolution;

a plurality of parallel-connected comparators for comparing an analog input signal with said reference signals;

adder means for adding outputs of said comparators belonging to each of groups obtained by dividing said plural comparators into groups each consisting of a predetermined number of said comparators;

level discrimination means for deciding whether or not the



output level of each of said adder means exceeds a predetermined threshold level;

high-order code conversion means for determining high-order bits on the basis of the values of the outputs of said level discrimination means; and

low-order code conversion means for determining low-order bits on the basis of the values of the outputs of said level discrimination means.

4,978,958

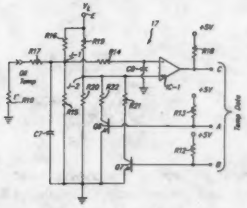
A/D CONVERTER

Noel A. Walker, Royal Oak, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 382,515, Jul. 20, 1989. This application Oct. 11, 1989, Ser. No. 419,803

Int. Cl.[5] H03M *1/34*

U.S. Cl. 341—159 **8 Claims**



1. A circuit for converting an analog electrical signal to a digital signal comprising:

means containing sampling and reference input terminals and an output terminal for comparing said analog signal applied to said sampling terminal with a predetermined D.C. reference level applied to said reference input terminal to generate a first binary level output signal on said output terminal corresponding to said analog signal having a value determined by said comparing means as being greater than said predetermined reference level and a second binary level ouput signal having a value determined by said comparing means as being greater than said predetermined reference level;

means for applying a predetermined reference level to said reference input terminal of said comparing means, wherein said reference level applying means includes a reference voltage divider circuit including at least two reference resistors connected in series between a D.C. voltage source and ground;

N switchable resistive networks connected in parallel with at least one of the series resistors in said reference voltage divider circuit, wherein "N" is a positive integer being greater than zero (0);

means for individually switching each of said switchable resistive networks into and out of electrical connection in parallel with said at least one of the series resistors in said reference voltage divider circuit, wherein each of said N switchable resistive networks includes at least one resistor connected in series with an electrical switch that is controllable to open and close in response to applied binary signals, and each switch being connected to a corresponding control terminal; and whereby, the selection of binary signals applied to said N control terminals and monitoring of the binarY output signal from said comparing means provides a combined digital binary output representation of the sampled analog signal value to be at least within R adjacent voltage ranges where $R=2^N-1$.

4,978,959

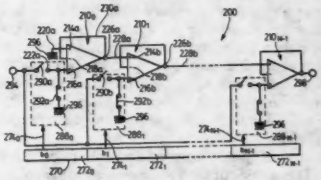
ANALOG TO DIGITAL CONVERTER, A DIGITAL TO ANALOG CONVERTER AND AN OPERATIONAL AMPLIFIER THEREFOR

Chu P. Chong; Kenneth C. Smith, both of Toronto, and Zvonko G. Vranesic, Islington, all of Canada, assignors to University of Toronto Innovations Foundation, Canada

Continuation-in-part of Ser. No. 107,365, Oct. 8, 1987, abandoned. This application Feb. 27, 1989, Ser. No. 317,157

Int. Cl.[5] H03M *1/44, 1/72*; H03F *3/45*

U.S. Cl. 341—161 **51 Claims**



21. A digital to analog converter for converting an N digit number to an analog signal comprising:

a reference source for providing a reference signal;

a value source for providing a value signal for each of said N digits, said value signals being dependent on the value of said digit; and

at least N number of serially connected operational amplifiers receiving first, second and third input signals, each of said amplifiers being associated with one of said bits and providing an output signal equal to the sum of said first and second input signals factored by 1/X wherein X is greater of equal to 2, said output signal being applied to the preceding amplifier via an output line, each of said amplifiers comprising:

at least first and second non-inverting input terminals and a third inverting input terminal, said first terminal being connected to said value source and said second terminal being connected to said output line, except the second terminal of said first amplifier which receives said reference signal;

a differential section receiving said first, second and third input signals and forming therefrom a pair of difference signals;

logic means receiving said difference signals and performing operations thereon to provide said output signal, said output signal being equivalent to the sum of said difference signals factored by a gain; and

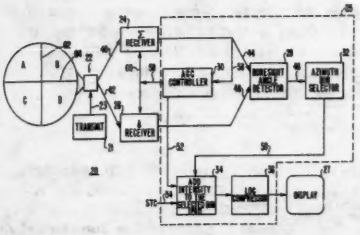
feedback means for connecting said output line to said third terminal.

4,978,960

METHOD AND SYSTEM FOR REAL APERTURE RADAR GROUND MAPPING

Gary L. Newcomb, Catonsville; Timothy E. Brandt, Hanover; Scott C. Borden, Greenbelt, and Joseph Stevenson, Catonsville, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 27, 1988, Ser. No. 290,205
Int. Cl.[5] G01S *13/89, 13/90*
U.S. Cl. 342—25 **18 Claims**



1. A method of real aperture radar ground mapping, comprising:

scanning a monopulse antenna having a central boresight, over a ground surface area to be mapped;

transmitting along the boresight a plurality of radar pulses, each having a predetermined angular beamwidth, during each of a plurality of spaced azimuth intervals, each azimuth interval defining an antenna look, the transmitted radar pulses during each look illuminating a total ground area in azimuth corresponding to the beamwidth thereof;

receiving and detecting at the antenna, during each look, return energy of the reflected pulses of the illuminated area at distinct times corresponding to respective range intervals;

calculating a predetermined plurality of distinct off-boresight angles of the return energy for each range interval;

converting each of the plurality of calculated off-boresight angles to a different contiguous azimuth bin for each range interval, each azimuth bin corresponding to a fractional portion in azimuth of the total illuminated ground area during each look;

displaying the detected reflected energy of each distinct azimuth bin in successive azimuth bins of the total illuminated ground area for subsequent antenna looks.

4,978,961

SYNTHETIC APERTURE RADAR WITH DEAD-AHEAD BEAM SHARPENING CAPABILITY

Fred C. Williams, deceased, late of Vancouver, and by Dorothy Williams, executor, Vancouver, Wash., assignors to Hughes Aircraft Company, Los Angeles, Calif.

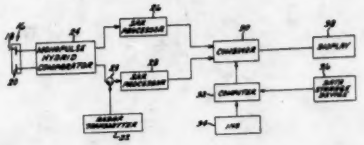
Filed Dec. 21, 1989, Ser. No. 454,793
Int. Cl.[5] G01S *13/90*
U.S. Cl. 342—25 **9 Claims**

1. A synthetic aperture radar (SAR) apparatus having dead-ahead beam sharpening capability in a moving craft, comprising:

means for receiving on board the moving craft radar returns with a monopulse antenna having a sum port and a difference port to provide a sum port signal from the sum port and a difference port signal from the difference port;

first SAR processing means for processing the sum port signals over a given time period to generate a first set of SAR signals representing the radar returns from the respective cells of a doppler frequency, range grid, said first set of SAR signals characterized by doppler ambiguities from azimuth angles on opposite sides of the velocity vector of the moving craft;

second SAR processing means for processing the difference port signals over a given time period to generate a second set of SAR signals representing the radar returns from the respective cells of the grid; and



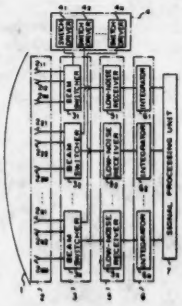
means for performing a weighted linear combination of said first and second sets of SAR signals to form first output signals representing a left looking antenna where the ambiguous returns to the right of the velocity vector are cancelled, and second output signals representing a right looking antenna, wherein the ambiguous returns to the left of the velocity vector are cancelled.

4,978,962

ELECTRICALLY SCANNING MICROWAVE RADIOMETER

Yasumasa Hisada; Kazuo Tachi, both of Ibaraki; Toshio Imatani, Kanagawa; Hirokazu Tanaka, Kanagawa; Hiroyuki Inahata, Kanagawa, and Tatsuhiro Noguchi, Kanagawa, all of Japan, assignors to National Space Development Agency of Japan and Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1989, Ser. No. 418,164
Claims priority, application Japan, Nov. 7, 1988, 63-280626
Int. Cl.[5] G01S *3/02*
U.S. Cl. 342—351 **62 Claims**



1. An electrically scanning microwave radiometer for measuring the brightness temperature of an object by performing conical scanning of the object comprising:

reflector means having a focal line of predetermined configuration;

an array of N×M radiators arranged along the focal line of said reflector means, where M and N are integers, M being more than two and N being more than one, said radiators being grouped to form a number N of subarrays each including M adjacent radiators;

a number N of beam switching means provided in correspondence with said respective subarrays and operable to switch beams formed by said radiators correspondingly selected from said respective subarrays to output a different set of N signals sequentially; and

signal processing means for receiving and arithmetically operating the sequentially output sets of N signals from said N beam switching means to obtain the brightness temperature value of the object located within the width of the antenna beam, thereby suppressing the variation of

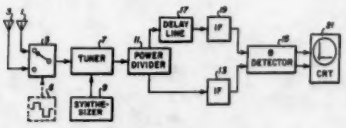
the brightness temperature value and making the value of temperature resolution smaller.

4,978,963

RF SIGNAL DIRECTION FINDING APPARATUS

J. Carlton Thorpe, Poway, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Continuation of Ser. No. 265,071, Oct. 31, 1988, abandoned.
This application Mar. 26, 1990, Ser. No. 498,469
Int. Cl.[5] G01S *5/04*
U.S. Cl. 342—433 23 Claims



1. An RF direction finding system for determining angle of arrival of RF pulse signals, said pulse signals being within a predetermined range of pulse durations and within a predetermined range of pulse repetition rates, comprising:

at least two physically spaced receiving antennas;

RF tuner means for converting received RF signals applied at an input to an intermediate frequency signal at an output;

antenna switching means for alternately periodically coupling each of said antenna means to said tuner means input for essentially equal predetermined dwell intervals to pass the RF signal in the phase received at the respective antennas to said tuner;

said antenna switching means having an output coupled to said tuner means input and a pair of inputs connected to respective ones of said antennas;

power divider means; said power divider means containing an input and two outputs; said power divider means input being connected to the output of said tuner means for dividing the inputted intermediate frequency signal between two power divider means outputs;

phase detector means;

first branch circuit means for coupling one output of said power divider to a first input of said phase detector means, said first branch circuit means including IF amplifier means;

second branch circuit means, including signal delay means and IF amplifier means serially connected, coupled in circuit between said second output of said power divider and a second input of said phase detector;

said signal delay means for delaying the application of signals applied at an input to an output by a predetermined delay interval;

said antenna switching means being operative to switch between antennas within a predetermined switching interval, and at a predetermined switching rate;

said switching interval being substantially less than said predetermined dwell interval and substantially less than said delay interval;

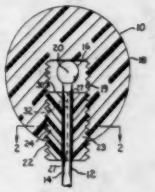
said dwell interval being no greater than one half of said pulse width or duration; whereby IF signals representative of RF signal received at the first antenna and of the same signal as received at the second antenna overlaps in time at the input of said phase detector means.

4,978,964

LIGHT REFLECTING ANTENNA BALL

James Castille, 910 N. Enterprise, Inglewood, Calif. 90302

Filed May 8, 1989, Ser. No. 348,402
Int. Cl.[5] B60R *13/00*
U.S. Cl. 343—715 5 Claims



1. A light reflecting ornament for attachment to an automotive radio antenna, wherein said antenna includes an upstanding rod and an enlargement on the upper end of the rod, said ornament comprising;

an ornament body having a threaded socket extending therein;

a split plug having external threads mated to the threads in the above-mentioned socket, whereby said split plug can be threaded into the socket;

said plug being split along an axial plane extending through the plug diameter, whereby said plug is comprised of two separable semi-cylindrical plug sections; each plug section having a flat internal face extending along the plug diameter and a cylindrical threaded outer face;

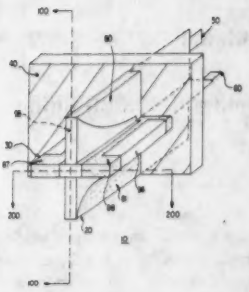
each plug section having a semi-cylindrical recess in its flat internal face, whereby the two plug sections can be positioned around an antenna rod prior to threading the plug into the threaded socket.

4,978,965

BROADBAND DUAL-POLARIZED FRAMELESS RADIATING ELEMENT

Wolodymyr Mohuchy, Nutley, N.J., assignor to ITT Corporation, New York, N.Y.

Filed Apr. 11, 1989, Ser. No. 336,290
Int. Cl.[5] H01Q *1/38, 21/28*
U.S. Cl. 343—727 9 Claims



1. A dual-polarization radiating element comprises:

a notch radiating element disposed in a given plane and symmetrically arranged about a center line of said given plane;

a dipole radiating element disposed in a plane perpendicular to said given plane and symmetrically arranged about a center line of said perpendicular plane, said dipole radiating element being interlocked with said notch radiating element with said planes intersecting at said center lines to form a single radiating structure with the notch radiating element being of a completely different configuration than the dipole radiating element and with the phase center of

said notch radiating element coinciding with the phase center of said dipole radiating element; and

a structural planar absorber means which is affixed to and behind the structure of the interlocked notch radiating element and the dipole radiating element and positioned perpendicular to both of said planes such that both of said elements project in front of the absorber means.

4,978,966

CARBORNE ANTENNA

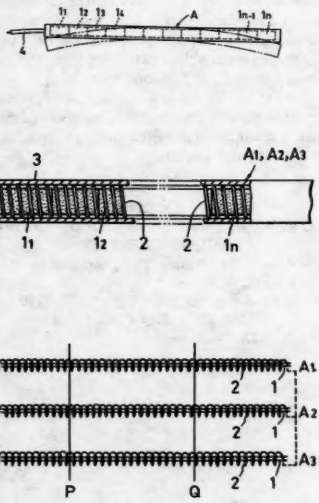
Akio Takizawa; Fumio Furuta, and Syozo Saito, all of Warabi, Japan, assignors to Nippon Antenna Co., Ltd., Tokyo, Japan

Filed Jun. 16, 1989, Ser. No. 367,447

Claims priority, application Japan, Jun. 24, 1988, 63-156056; Aug. 24, 1988, 63-209783; Sep. 26, 1988, 63-242097

Int. Cl.[5] H01Q *1/000, 7/080, 1/320*

U.S. Cl. 343—788 **6 Claims**



1. A carborne antenna, comprising: a plurality of core arrays, each having a plurality of rod-shaped cores arranged in an end-to-end relationship and an antenna coil bendably wound on the core array along the entire length thereof, each said antenna coil having first and second ends; wherein said core arrays are disposed in a side-by-side relationship and said first ends of said antenna coils of said core arrays are adjacent and connected together to form a parallel feeding terminal, all of said core arrays being identical in current and voltage distribution so that one of said core arrays operates as an antenna element while the rest of said core arrays behave as stabilizing elements; including a flexible insulator which covers the outer periphery of each said antenna coil; wherein said insulator has extending therethrough a plurality of spaced, lengthwise openings which are parallel, and wherein each said core array is disposed in a respective said opening in said insulator.

4,978,967

OFFSET ANTENNA

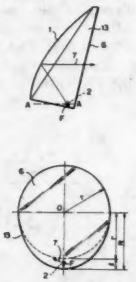
Toshio Masujima, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 12, 1988, Ser. No. 155,605

Claims priority, application Japan, Feb. 13, 1987, 62-19537[U]; Feb. 16, 1987, 62-20989[U]; Aug. 18, 1987, 62-204316; Nov. 25, 1987, 62-296616

Int. Cl.[5] H01Q *19/13*

U.S. Cl. 343—781 R **18 Claims**



1. An enclosure for an offset antenna having a reflecting mirror with a focal point and a smoothly-curved periphery and a primary electromagnetic wave radiator, said enclosure comprising:

a planar radome plate having a smoothly-curved periphery located adjacent said reflecting mirror and at an angle thereto so that electromagnetic waves having a phase center generated by said primary radiator and reflected from said reflecting mirror pass through said radome plate; and

a smooth-curved non-cylindrical side wall connecting said reflecting mirror periphery to said radome plate periphery, said side wall forming a surface which is the outer envelope formed by an infinite series of elliptical cones, each of said cones having a vertex on said radome plate periphery and having said reflecting mirror periphery as a base.

4,978,968

IMAGE RECORDING APPARATUS

Noriyoshi Ishikawa; Toshiharu Inui; Yasuyuki Tamura, all of Yokohama, and Toshiaki Harada, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 86,720, Aug. 18, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,088

Claims priority, application Japan, Aug. 22, 1986, 61-195182; Oct. 27, 1986, 61-253778; Nov. 6, 1986, 61-262661; Nov. 13, 1986, 61-268676; Nov. 27, 1986, 61-280736; Nov. 27, 1986, 61-280737; Dec. 1, 1986, 61-284424; Dec. 1, 1986, 61-284427; Dec. 1, 1986, 61-284428

Int. Cl.[5] G01D *9/00*

U.S. Cl. 346—1.1 **35 Claims**

1. A recording apparatus for recording an image onto a medium to be recorded comprising:

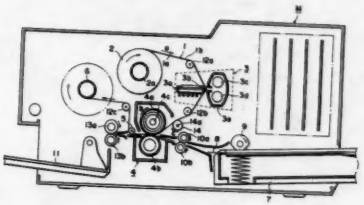
(a) conveying means for conveying a transfer recording medium having a transfer recording layer the transfer characteristics of which vary upon application of a plurality of kinds of energy;

(b) a recording section disposed along an advancing route of said transfer recording medium conveyed by said conveying means and having energy application means for selectively applying said plurality of kinds of energy to said transfer recording medium;

(c) a transfer section for transferring an image formed on

said transfer recording medium in said recording section onto said recording medium;

(d) a contacting member for contacting and effecting said transfer recording layer of said transfer recording medium downstream of said recording section and upstream of said transfer section with respect to a conveyance direc-



tion of said transfer recording medium conveyed by said conveying means, said contacting member being a rotatable roller having projections on the peripheral surface thereof for contacting the transfer recording layer to scrape it by rotation and

(e) rotating means for rotating the contacting member.

4,978,969

METHOD FOR PRINTING USING ULTRA-VIOLET CURABLE INK

C. K. Chieng, Bukit Merah Central, Singapore, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 5, 1989, Ser. No. 376,349
Int. Cl.[5] B41J *2/05*
U.S. Cl. 346—1.1 **6 Claims**

1. A method for printing comprising the steps of:

providing printing means for delivering ink to a substrate, said printing means comprising a thermal ink jet printing apparatus;

supplying said thermal ink jet printing apparatus with an ultra-violet curable ink composition comprising in combination about 12–80% by weight ultra-violet curable adhesive, about 3–10% by weight dye pigment, and about 10–40% by weight solvent;

delivering said ink composition from said thermal ink jet printing apparatus to said substrate; and

applying ultra-violet light to said substrate with said ink composition thereon in an amount sufficient to form a permanent image on said substrate from said ink composition.

4,978,970

SCANNING/RECORDING SYSTEM WITH PLURAL BEAM OVERLAP WITHOUT INTERFERENCE

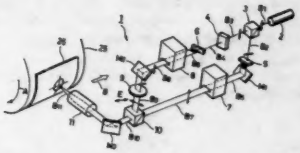
Masahide Okazaki, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Jul. 14, 1988, Ser. No. 219,439
Claims priority, application Japan, Jul. 17, 1987, 62-179631; Jul. 22, 1987, 62-184299; Jul. 22, 1987, 62-184300; Jul. 22, 1987, 62-184301; Mar. 17, 1988, 63-64889; Mar. 18, 1988, 63-66067
Int. Cl.[5] G01D *15/14*
U.S. Cl. 346—1.1 **32 Claims**

12. A method of exposing a recording medium to form an image, comprising the steps of:

forming two laser beams; said forming step including the steps of providing a single laser light source, irradiating a source beam from said sourse, splitting said irradiated source beam into said laser beams, and polarizing said laser beams so that said beams are orthogonally polarized with respect to each other;

independently moduating said laser beams; and



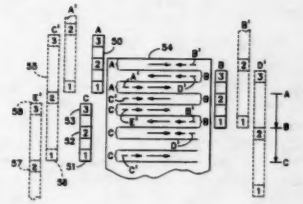
projecting said modulated laser beams in an overlapping manner onto a recording medium.

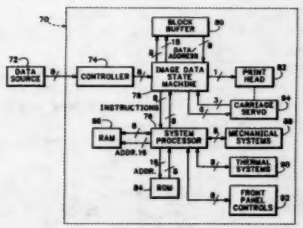
4,978,971

METHOD AND APPARATUS FOR REFORMATTING PRINT DATA

Howard V. Goetz, Tigard, and Richard A. Springer, Tualatin, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Nov. 6, 1989, Ser. No. 419,420
Int. Cl.[5] B41J *2/01*
U.S. Cl. 346—1.1 **37 Claims**





24. A method of printing an image formed of an array of lines and columns of pixel locations printed selectively with pixels over a predetermined area of a print medium, which lines have centers spaced a predetermined interline distance apart, using a print head having a plurality of pixel-printing elements in a predetermined configuration definable in terms of associated positions of pixel locations on an image to be printed, the method comprising the steps of:

storing in an addressable memory data elements corresponding to pixel locations of an image to be printed;

positioning the print head relative to a print medium so that at least one pixel-printing element is positioned to print a pixel on a pixel location of the image for which corresponding data elements are stored in memory;

determining the memory address corresponding to the pixel location of the one pixel-printing element;

calculating from the memory address corresponding to the

pixel location associated with the one pixel-printing element the memory address corresponding to the pixel location associated with each of the other pixel-printing elements using the defined configuration of pixel-printing elements;

reading the data elements corresponding to the memory addresses for each of the pixel-printing elements;

transmitting the read data elements to the associated pixel-printing elements; and

printing with each of the pixel-printing elements as defined by the transmitted data elements.

4,978,972

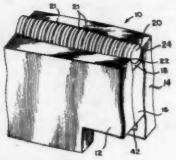
MODULAR THERMAL PRINT HEAD AND METHOD OF FABRICATION

Luke R. Volpe, Jr., Melrose, and Lowell E. Thomas, Tewksbury, both of Mass., assignors to Dynamics Research Corporation, Wilmington, Mass.

Filed Oct. 13, 1989, Ser. No. 421,534

Int. Cl.[5] G01D 15/10; B41J 3/20

U.S. Cl. 346—76 PH 20 Claims



1. A modular thermal print head comprising:

a first member including at least one surface on which is disposed an array of spaced electrodes;

a second member, mounted in spaced relationship to said first member, and including at least one surface having a single conductor element disposed on at least a portion of said surface;

thermal print means, disposed between said first and second members, in contact with said array of spaced electrodes on said first member and said single conductor element on said second member, for conducting electrical current and producing thermal printing energy; and

spacer means for mounting said first and second members in non-contacting, spaced relationship to one another, said spacer means being located intermediate to said first and second members and having integral recesses for mounting circuitry related to said thermal print means.

4,978,973

THERMAL PRINTER

Akira Ogushi, and Hisashi Uemura, both of Hyogo, Japan, assignors to Kanzaki Paper Mfg. Co., Ltd., Japan

Filed Dec. 11, 1989, Ser. No. 448,236

Int. Cl.[5] G01D 15/10

U.S. Cl. 346—76 PH 2 Claims

1. A thermal printer including a line thermal head having heating elements, comprising:

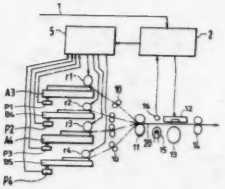
means for selectively feeding one of said papers from said receiving means to said thermal head;

electric power supply means for supplying electric power to said heating elements; and

control means for controlling said electric power supplied from said electric power supply means in response to a size of the selected paper, said control means including a first means for preventing said electric power from being supplied to a part of said heating elements located in a predetermined width on each side of said line thermal head in response to a width of the selected paper;

a detector means for detecting said selected paper, said detector means being provided on an inlet side of said line thermal head and for generating a detection signal for a predetermined period of time, and

a second means for preventing said electric power from being supplied to all said heating elements of said thermal head before a lapse of a predetermined time lag from a



time when said detection signal has been generated and after another predetermined time lag from a time when said detection signal has been terminated;

whereby any waste idle heat of said heating elements may be avoided.

4,978,974

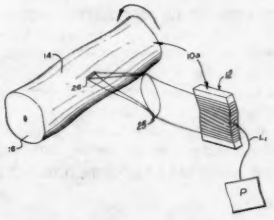
IMAGE RECORDER WITH LINEAR LASER DIODE ARRAY

Mark R. Etzel, Madison, Wis., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 30, 1989, Ser. No. 401,160

Int. Cl.[5] G01D 15/16; B41J 2/44

U.S. Cl. 346—107 R 10 Claims



1. An imaging recorder device wherein images are produced by the application patterns to an imaging material comprising:

means for moving an imaging material along a predetermined path

a plurality of light radiating elements in spaced relation with the path of the material and disposed to project their output toward the path of the material;

means for applying power simultaneously to said plurality of light radiating elements as a group to heat the thermal imaging material, said light radiating elements being linearly arranged in a direction substantially parallel to the path of movement of the material; and

optical means disposed between said light radiating elements and the path of the material for converting the image of said light radiating elements on the material to an irradiated region which is elongated in a direction linearly perpendicular to the movement of the material.

4,978,975

LASER SCANNING APPARATUS WITH DEFLECTOR AND RECEIVER IN AN OPTICALLY CONJUGATE RELATIONSHIP

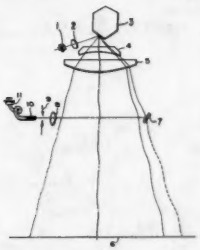
Hiroshi Saito, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Japan

Filed Nov. 10, 1988, Ser. No. 269,379

Claims priority, application Japan, Nov. 13, 1987, 62-286819

Int. Cl.[5] G01D 15/14; G02B 26/08

U.S. Cl. 346—108 11 Claims



1. A laser recording apparatus comprising:

laser generating means for generating a laser beam;

deflecting means for deflecting the laser beam from said laser generating means to apply the laser beam to the surface of a recording medium; and

light receiving means for receiving the laser beam deflected by said deflecting means and for obtaining a timing to start modulation of the laser beam to be applied to the surface of the recording medium, said light receiving means including a reflecting member for reflecting the deflected laser beam, a condensing member for condensing the laser beam reflected by said reflecting member, and a light receiving member for receiving the laser beam condensed by said condensing member, said reflecting member and said light receiving member being in optically substantially conjugate relationship with said condensing member in a cross-section perpendicular to a plane in which the laser beam is deflected by said deflecting means, the optical path from said reflecting member to said condensing member being shorter than the imaginary optical path from said reflecting member to the surface of the recording medium.

4,978,976

IMAGE RECORDER WITH PLURAL BEAM SCAN SYNCHRONIZATION

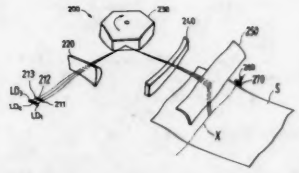
Yoshiharu Okino, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 26, 1988, Ser. No. 248,767

Claims priority, application Japan, Sep. 25, 1987, 62-240210

Int. Cl.[5] G01D 15/16; H04N 1/46

U.S. Cl. 346—108 5 Claims



1. An image recording apparatus in which a photo-sensitive material is scanned on a single scanning line with a plurality of light beams different in wavelength simultaneously to record an image, which comprises:

line synchronization detecting means for detecting the scanning synchronization of one of said plurality of light beams which is selected as a reference light beam;

irradiating light beam detecting means for detecting said plurality of light beams at a position spaced a predetermined distance from said line synchronization detecting means in the scanning direction;

detecting means for utilizing output signals of said two detecting means, to detect the irradiating position shift of each of said plurality of light beams in said scanning direction; and

light emission timing control means for utilizing output signals of said detecting means, to determine the timing of irradiation of said photo-sensitive material with said plurality of light beams.

4,978,977

LASER SCANNER WITH CONJUGATE CONDITION LENS

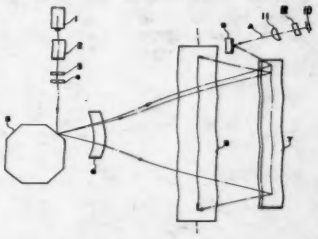
Naoto Ohmori; Yasuhiro Matsuura; Hirofumi Hasegawa; Hiroaki Kojima, and Yukio Yamada, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 7, 1989, Ser. No. 376,826

Claims priority, application Japan, Jul. 11, 1988, 63-172092

Int. Cl.[5] G02B 26/08; G01D 15/16

U.S. Cl. 346—108 5 Claims



1. In a laser scanning optical system which scans a beam receiving surface with a laser beam in a scanning direction, improvement comprising,

a sensor disposed at a position beyond a specific position equivalent to said beam receiving surface and receiving the laser beam for commanding start of modulation of the laser beam, and

a lens unit means which is interposed between said specific position and said sensor to maintain a conjugate condition therebetween and to provide a magnification smaller than 1 in a direction perpendicular to the scanning direction.

4,978,978

PHOTOSENSITIVE MICROCAPSULE SHEET

RECORDER WITH CRT IMAGE PROJECTION

Yasumasa Yamada, Tokyo, Japan, assignor to Seiko Instruments Inc., Japan

Filed Nov. 23, 1988, Ser. No. 276,228

Claims priority, application Japan, Nov. 27, 1987, 62-299547; Nov. 28, 1987, 62-300585

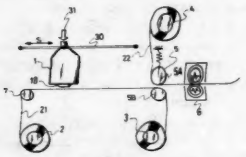
Int. Cl.[5] G01D 15/14; G03C 1/72

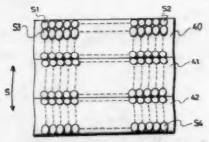
U.S. Cl. 346—110 R 15 Claims

11. A method of forming a latent image on a photosensitive sheet and developing the latent image to form a visible image, comprising the steps of:

transmitting different parts of an optical image through different groups of optical fibers to form a latent image on a photosensitive sheet;

selectively varying the number of times each optical image part is transmitted through its respective optical fiber





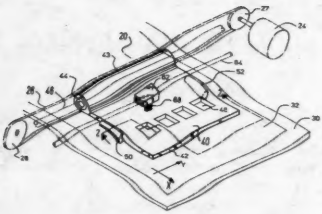
group to thereby control the tone gradation of the latent image; and developing the latent image to form a visible image.

4,978,979

WHEEL SUPPORTED CARRIAGE FOR A SCANNING PLOTTER

Stuart D. Asakawa, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 3, 1989, Ser. No. 389,026
Int. Cl.[5] B41J 2/01
U.S. Cl. 346—140 R 4 Claims



1. A plotter head carriage for an ink jet plotter in which the carriage is mounted above a drafting medium support surface on a slider rod for movement transversely to the path of movement of a medium on which drafting is to take place, said carriage comprising:

(a) a rigid carriage member;

(b) bearing means on said carriage member for receiving an elongated support rod on which said carriage is to be partially supported for sliding movement in the direction of said support rod and for pivotal movement of said carriage member about said support rod;

(c) at least two rolling supports mounted in bearings on said carriage member for rotation about spaced parallel axes disposed perpendicular to said support rod, at least one of said supports being in rolling contact with the paper or other medium upon which printing is to take place during the printing operation; and

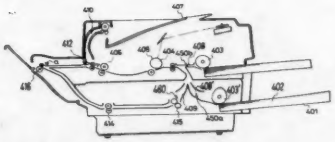
(d) means on said carriage member for mounting at least one ink jet plotting head thereon between said spaced axes, and said rolling supports being disposed on said carriage member between said support rod and said means for mounting said at least one ink jet plotting head.

4,978,980

CONTROL METHOD FOR A BOTH-SURFACE/MULTIPLEX RECORDING APPARATUS

Akio Noguchi, Ebina, and Hiroshi Hashimoto, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 372,120, Jun. 28, 1989, abandoned, which is a continuation of Ser. No. 289,464, Dec. 22, 1988, abandoned, which is a continuation of Ser. No. 204,616, Jun. 9, 1988, abandoned. This application Feb. 9, 1990, Ser. No. 478,735
Claims priority, application Japan, Jun. 16, 1987, 62-149389; Jul. 6, 1987, 62-166942
Int. Cl.[5] G01D 15/00
U.S. Cl. 346—150 14 Claims



1. A control method for a both-surface recording apparatus provided with memory means for memorizing and reading record information sequent on each page, recording means for recording the record information of a plurality of pages, out of said information, discretely on a first surface and a second surface of a recording medium, and control means, for controlling said memory means and circulation of said recording means in the apparatus, characterized in:

that recording of different pages is continuously effected on a first surface of each of plural new recording media until the first recording medium on a first surface of which recording has been effected again arrives at the entrance to said recording means; and

that thereafter, recording of a page sequent to a page of the first surface of said first recording medium is effected on a second surface of the first recording medium, whereafter recording of a page on a first surface of another new recording medium, and recording of a page segment to the page of the first surface of the recording medium on a second surface of the recording medium on the first surface of which recording has been effected, and circulating of the media in the apparatus, are alternatively effected.

4,978,981

EXPOSURE CONTROL DEVICE

Osamu Satoh; Isamu Hirai, and Masahiro Nakata, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

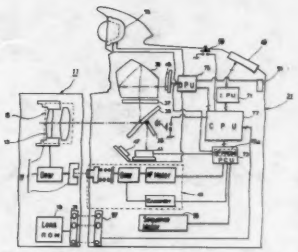
Filed Apr. 25, 1989, Ser. No. 342,887
Claims priority, application Japan, Apr. 25, 1988, 63-101659; Apr. 25, 1988, 63-101660; May 24, 1988, 63-126855
Int. Cl.[5] G03B 7/00, 1/18, 7/08
U.S. Cl. 354—410 19 Claims

1. An exposure control device of a camera, comprising:

means for detecting a focal length f of a photographic lens attached to a camera body of said camera;

means for calculating an exposure for obtaining a camera-shake limit shutter speed T_v according to said focal length

f of said photographic lens, according to an equation $T_{vf}=(\log_2 f)\cdot\alpha+\beta$, wherein $\alpha<1$, and α and β are constants satisfying an equation $\log_2 f_0=(\log_2 f_0)\cdot\alpha+\beta$ for a predetermined focal length f_0.



4,978,982

PHOTOGRAPHIC CAMERA WITH BUILT-IN E2PROM

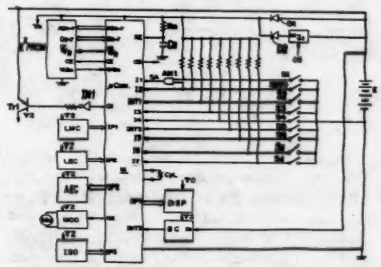
Norio Ishikawa, Osaka; Masaaki Nakai, Kawachinagano, and Manabu Inoue, Kobe, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 268,471, Nov. 8, 1988, Pat. No. 4,912,492, which is a division of Ser. No. 106,774, Oct. 13, 1987, Pat. No. 4,783,674. This application Feb. 26, 1990, Ser. No. 484,348

Claims priority, application Japan, Oct. 13, 1986, 61-242806; Oct. 13, 1986, 61-242807

Int. Cl.[5] G03B 7/24

U.S. Cl. 354—21 2 Claims



1. A data rewriting apparatus for a photographic camera, which comprises:

a reading means for reading the film speed recorded on a container of a film in use;

a first storage means including a random access memory for the storage of the film speed read by said reading means;

a second storage means including an electrically erasable and programmable read only memory for the storage of the film speed;

a rewriting means for rewriting a value stored in the second storage means to a value stored in the first storage means;

a comparing means for comparing the value stored in the second storage means with that stored in the first storage means; and

a rewrite control means operable to inhibit a rewriting operation of the rewriting means when the comparing means indicates that the value stored in the second storage means is identical with that stored in the first storage means, but to permit the rewriting operation of the rewriting means when the comparing means indicates that the value stored in the second storage means is not identical with that stored in the first storage means.

4,978,983

COMPOSITE CAMERA WITH AUTOMATIC PARALLAX CORRECTION

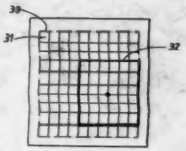
Lennart StÅlfors, Hindbyvägen 29, S-430 63 Hindås, Sweden

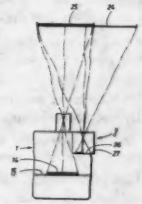
Filed Jun. 19, 1989, Ser. No. 367,896

Claims priority, application Sweden, Jul. 6, 1988, 8802523

Int. Cl.[5] G03B 29/00, 35/08; G02B 13/16

U.S. Cl. 354—76 3 Claims





1. A composite camera arrangement forming a camera unit, said camera unit comprising:

a first camera for photochemical image registration on film of a first projected image, the first camera including:

a first lens having a first image registration region and a first optical axis;

a first image plane;

lens data means for generating lens state signals according to the state of the first lens, including a focal length signal and a focussed distance signal;

said first projected image being projected onto the first image plane and corresponding to the first image registration region;

a second camera for electronic image registration including:

a second lens having a second image registration region, and having a second optical axis displaced from the first optical axis;

photosensitive means for photoelectrically registering the first and second image registration regions, including a plurality of photosensitive elements;

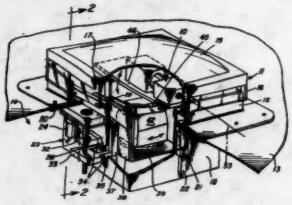
control means for receiving the lens state signals; for selecting, on the basis of the lens state signals and the displacement of the first optical axis from the second otical axis, from among the photosensitive elements primary photosensitive elements corresponding to and registering the first registration region; and for generating an output signal corresponding to a photoelectric representation of the first projected image; and

in which the focal length of the first lens is in a predetermined range, and in which the second lens has an image angle sufficiently large that the first image registration region is contained in the second image registration region for all focal lengths of the first lens in the predetermined range.

4,978,984
SURVEILLANCE APPARATUS

Richard A. Brookfield, 9625 Merrimoor, Largo, Fla. 33543

Filed Aug. 15, 1989, Ser. No. 393,266
Int. Cl.[5] G03B 29/00
U.S. Cl. 354—81 14 Claims



1. Surveillance apparatus including an open ended housing member connected to a wall member of a chamber with one end opening into the interior thereof and the other end spaced outwardly of the wall member, a cover having a cap and depending side walls so shaped and dimensioned that the side walls and said other end may fit together in an overlapping relationship, the cover also including first supporting means extending into the housing member, second supporting means fitting freely within the housing member, a surveillance unit rotatably supported by the second supporting means, said unit including a camera and lens assembly and means operable to tilt the unit and the center line of the lens upwardly or downwardly relative to a first position normal to the axis of rotation of the unit, and reversible drive means held by one of said members and connected to the supporting means, said drive means operable to raise the two supporting means from and return them to a first relationship in which the walls of the cover and said other housing end overlap and the unit is spaced a predetermined distance from the cap with the lens center line above the lower ends of the side walls of the cover but shielded by said other end of the housing member and the side walls of the cover against outside light, said drive means operable simultaneously to raise the cover at a first rate to admit outside light into said other end of the housing member and to raise the second supporting means at a second, slower rate to keep the lens center line in a position between said other end of the housing member and the side walls of the cover in which the lens center line is exposed directly to outside light with the distance between the unit and the cap increased.

4,978,985
FILM CASSETTE HAVING FILM-EXPOSURE STATUS INDICATOR

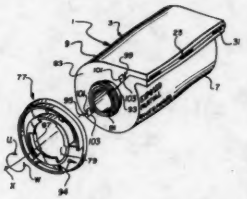
David C. Smart, Rochester; Robert P. Cloutier, Spencerport; Daniel M. Pagano, Henrietta, and Duane B. Kirk, Hilton, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 24, 1989, Ser. No. 384,332
Int. Cl.[5] G03B 17/26
U.S. Cl. 354—275 16 Claims

11. A film cassette wherein a filmstrip is advanced to the outside of a light-tight cassette shell in order to expose successive imaging areas of said filmstrip and can be returned to the inside of said cassette shell before all of said imaging areas have been exposed or after the filmstrip has been substantially completely exposed, characterized in that:

a film-exposure status indicator is supported on said cassette shell for movement relative to the shell from one position for providing a visible indication that said filmstrip is generally unexposed to another position for providing a visible indication that the filmstrip is exposed; and

said cassette shell and said indicator include cooperative engagement means for preventing return of the indicator

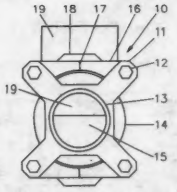


to the one position when the indicator is in the other position.

4,978,986
CAMERA ACCESSORIES FOR CONTRAST CONTROL

McGlachlin Hatch, 1803 Ivy Oak Sq., Reston, Va. 27090

Filed Jan. 31, 1990, Ser. No. 472,798
Int. Cl.[5] G03B 11/00
U.S. Cl. 354—295 4 Claims



1. A camera accessory for altering contrast between dark and light areas of photographs, comprising:

a. a frame comprising front, middle and rear plates for holding freely rotatable and linearly movable polarized filters in front of a camera lens or flash unit;

b. said frame having connecting means at four corners for easy assembly and for frictionally holding said linearly movable polarized filters;

c. guide means, positioned by said connecting means, for separating two of said plates and for containing a round filter carrier;

d. said filter carrier having a diameter of about twice the diameter of said lens, or twice the width of the face of said flash unit, and having a flanged edge for cooperation with said guide means and for providing a recess for said rotatable polarized filter;

e. windows for the passage of light through said plates and said filter carrier;

f. said frame having at least one side cut back nearly to said windows, to prominently expose said filter carrier for observation and easy manipulation;

g. said filter carrier having calibration marks, preferably in f-stops, for alignment with base marks on said frame or guide means;

h. attachment means for removably connecting said frame to said lens or said flash unit; and

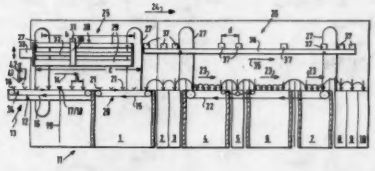
i. one or more of said linearly movable polarized filters inserted from any of four directions and frictionally held between two of said plates.

4,978,987

APPARATUS FOR DEVELOPMENT AND AFTER-TREATMENT OF PHOTOGRAPHIC MATERIAL TO BE DEVELOPED

Siegfried Nissler, Leinfelden-Echterdingen, Fed. Rep. of Germany, assignor to Autoplan Heimerdinger & Stabler GmbH & Co., Leinfelden-Echterdingen, Fed. Rep. of Germany

Filed Aug. 28, 1989, Ser. No. 399,228
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 8810863; Sep. 17, 1988, 8811829
Int. Cl.[5] G03D *13/10*
U.S. Cl. 354—322 8 Claims



1. Apparatus for developing and after-treatment of photographic development material in a plurality of containers arranged one after another in a row and having open tops, said row extending in a transfer direction and having a number of stations spaced apart in the transfer direction, said containers arranged to receive treatment fluids and protected at least partially from the incidence of light, a first transfer device located above a first one of said containers and having a dimension extending in the transfer direction, said container is arranged to receive a developing fluid, said first container having an upstream end and a downstream end in the transfer direction and said first transfer device is arranged to insert frames in said first container at individually variable locations spaced from the downstream end, said first transfer device extending in the transfer direction at the most approximately across the corresponding dimension of the first container, a second transfer device downstream from the first transfer device in the transfer direction and being lowerable into the containers in steps for transferring the frames from one station to another downstream station, said second transfer device arranged to hold a plurality of the frames in a number of the downstream containers, said second transfer device comprises a carrying element displaceable vertically and horizontally and located above the open tops of the containers, said carrying element is equipped with means for gripping the individual ones of the frames and having a horizontal advance equal to an incremental dimension of the transfer direction dimension thereof and a minimum stoke in the vertical direction equal to the height of the frames, wherein the improvement comprises a preparation station located at the upstream end of the first container and said first transfer device extends approximately across the preparation station in the transfer direction.

4,978,988

FOCUS DETECTION APPARATUS OF CAMERA

Toshihiko Karasaki, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha

Filed Nov. 16, 1987, Ser. No. 121,300
Claims priority, application Japan, Nov. 20, 1986, 61-278381
Int. Cl.[5] G03B *13/36*
U.S. Cl. 354—406 16 Claims

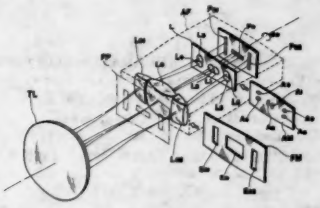
1. A focus detection apparatus of a camera for detecting a focusing condition of a photographic lens of the camera, comprising:

a plurality of focus detector assemblies, each comprising:

a condenser lens for condensing light which forms an image by the photographic lens;

a pair of re-imaging lenses for receiving a part of said image light from said condenser lens for dividingly reforming therefrom a first and a second partial image;

first and second light reception element groups arranged separately and in line with each other and for receiving said first and second partial images, respectively, whereby



mutual and positional differences between the first and second partial images are sensed as a function of the focusing condition of the photographic lens;

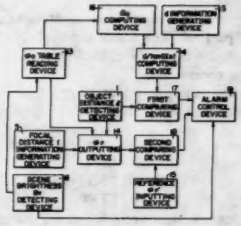
all of the re-imaging lenses being formed of plano-convex lenses having one and the same radius of curvature.

4,978,989

CAMERA HAVING A RED-EYE FORECASTING AND/OR PREVENTING DEVICE

Toshifumi Nakano; Akira Inoue, both of Hachioji; Juro Kikuchi, Yamanashi; Hiroaki Nakamura, Hachioji, and Tatsuji Higuchi, Akikawa, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Nov. 21, 1989, Ser. No. 439,787
Claims priority, application Japan, Nov. 25, 1988, 63-298850
Int. Cl.[5] G03B *7/00*
U.S. Cl. 354—413 43 Claims



1. For use with a camera having a taking lens and an electronic flash spaced a distance d from said taking lens, apparatus for detecting a potential red-eye phenomenon comprising;

first means for providing a signal representative of said distance d,

second means for providing a signal representative of the object distance l between a subject to be photographed and the camera;

third means responsive to said first and second means for determining whether the relation between the object distance l and the spacing distance d satisfies the formula

$$l > \frac{d}{\tan 3'}$$; and

signal means for providing a red-eye alarm signal when the aforesaid relation between object distance and spacing distance d is satisfied.

4,978,990

EXPOSURE CONTROL APPARATUS FOR CAMERA

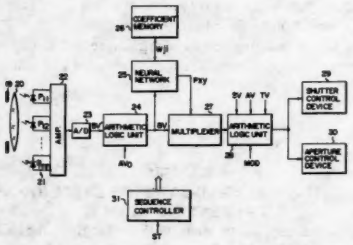
Masafumi Yamasaki; Toshiyuki Toyofuku; Junichi Itoh, all of Hachioji, and Shinichi Kodama, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 415,179

Claims priority, application Japan, Oct. 4, 1988, 63-250464; Oct. 4, 1988, 63-250467

Int. Cl.[5] G03B *7/08*

U.S. Cl. 354—432 **20 Claims**



1. An exposure control apparatus for a camera comprising:

light-receiving means, having a plurality of photoelectric transducer elements arranged in a two-dimensional matrix, for outputting analog signals representing brightnesses of respective parts of an object;

means for converting the analog signals output from said light-receiving means into digital signals;

neural network means for receiving the digital signals output from said converting means and determining a main part of the object;

means for selecting a signal representing the brightness of the main part of the object determined by said neural network means from the digital signals output from said converting means; and

means for performing exposure control on the basis of an output from said selecting means.

4,978,991

OPEN-LOOP STEPPER MOTOR CONTROLLED SHUTTER

David L. Farrington, Boxborough, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 29, 1989, Ser. No. 459,126

Int. Cl.[5] G03B *7/08*

U.S. Cl. 354—436 **8 Claims**

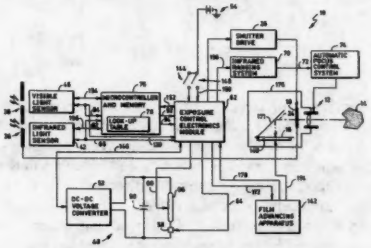
1. A photographic camera, comprising:

means for defining a film plane;

an optical system for directing image-carrying light rays along an optical path from a scene onto photosensitive material located in said film plane;

a shutter mechanism comprising a pair of overlapping shutter blade elements with each shutter blade element having an aperture therein that cooperatively define an exposure aperture, said shutter mechanism being mounted for movement between a blocking arrangement in which said shutter mechanism is in light blocking relation with respect to the optical path so as to preclude scene light from being transmitted along the optical path to said film plane and an unblocking arrangement in which said shutter mechanism is in light unblocking relation with respect to the optical path so as to allow the passage of scene light to said film plane through said exposure aperture when said shutter mechanism is actuated between its said light blocking and unblocking arrangements to produce an exposure interval;

means for storing at least characterizing elements of each curve in a set of aperture area defining curves representative of a desired shutter mechanism aperture area variation as a function of time wherein each curve in said set of aperture area defining curves is representative of a shutter mechanism aperture having the same rate of increasing and decreasing aperture area change, and for generating shutter mechanism open and close reference signals in response to a selected one curve of said set of aperture are defining curves;



means for generating shutter mechanism open and close signals;

means for sensing ambient scene light level and subject reflectivity and for generating respective signals representative thereof;

means responsive to said ambient scene light level signal and to said subject reflectivity signal for selecting one curve of said set of aperture area defining curves; and

drive means responsive to said shutter mechanism open signal and said shutter mechanism open reference signal for actuating said shutter mechanism between its said light blocking and its said light unblocking arrangements and responsive to said shutter mechanism close signal and said shutter mechanism close reference signal for actuating said shutter mechanism between its said light unblocking and its said light blocking arrangements.

4,978,992

ORIGINAL SIZE DETECTING APPARATUS OF AN IMAGE FORMING APPARATUS

Keiji Kusumoto; Toshikazu Kawaguchi, and Kenzo Nagata, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 19, 1989, Ser. No. 300,606

Claims priority, application Japan, Jan. 20, 1988, 63-11750; Jan. 20, 1988, 63-11751; Jan. 20, 1988, 63-11752

Int. Cl.[5] G03B *27/50*; G03G *15/00*

U.S. Cl. 355—51 **22 Claims**

1. An original size detecting apparatus comprising:

platen for supporting an original;

irradiating means for irradiating said platen on which the original is placed;

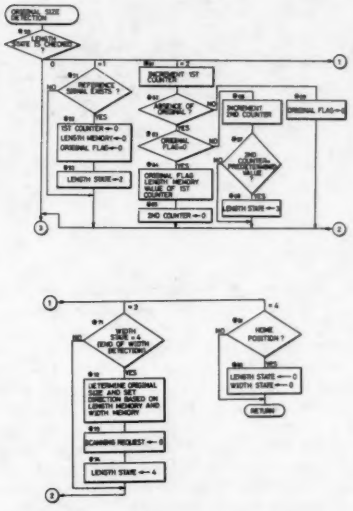
first detecting means for receiving light reflected from said platen irradiated by said irradiating means and detecting intensity of the received reflected light;

performing means for performing relative movement between said platen and said first detecting means while activating said irradiating means;

moving amount measuring means for measuring an amount of the relative movement;

first reference level detecting means for detecting coincidence between an output of said first detecting means and a first reference level;

storing means for storing the amount of the relative move-



ment measured by said moving amount measuring means every time when said first reference level detecting means produces an output; and

determining means, after an end of the relative movement, for determining a size of the original based on the amount of the relative movement finally stored in said storing means.

4,978,993

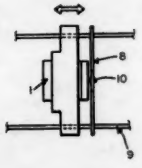
CORRECTION DEVICE FOR NON-UNIFORM ILLUMINATIONS IN RATIO-VARIABLE COPY MACHINE

Geun Kim, and Seung-Il Kang, both of Seoul, Rep. of Korea, assignors to Sindo Ricoh Co., Ltd., Seoul, Rep. of Korea

Filed Jun. 6, 1989, Ser. No. 362,227

Int. Cl.[5] G03B *27/36*

U.S. Cl. 355—58 **1 Claim**



1. In a correction device for non-uniform illumination in a ratio-variable copy machine in which enlargement and reduction copyings are made by displacing the lens and a part of the mirrors of the copy machine in the direction of the scanning and the original sheet is placed at the center of the optical axis the improvements provided to correct the non-uniformness of the illumination in the lengthwise direction of the slit

comprising; a pair of light adjusting plates disposed pivotally around a shaft and at a certain distance from the lens in the direction of the location of the light-sensitive medium; and

a pair of auxiliary light adjusting plates for displacing the angular position of said light adjusting plates relative to said shaft in an interlocked state with the displacement of the lens for different copying ratios,

said light adjusting plates are made not to shield the light path in the case of enlargement copying ratios, but said light adjusting plates are properly displaced to shield the light path corresponding with the copying ratio variations only in the case of reduction copyings in order to correct the non-uniformness of the illumination in the lengthwise direction of the slit.

4,978,994

EXPOSURE SYSTEM FOR IMAGE FORMING APPARATUS

Kenichi Shimizu, 1-775, Kosugijinyacho, Nakahara-ku, Kawasaki-shi, Japan

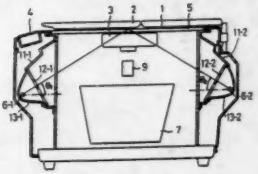
PCT No. PCT/JP88/00623, § 371 Date Feb. 16, 1989, § 102(e) Date Feb. 16, 1989

PCT Filed Jun. 23, 1988, Ser. No. 315,897

Claims priority, application Japan, Jun. 23, 1987, 62-154547

Int. Cl.[5] G03B *27/54*

U.S. Cl. 355—70 **4 Claims**



1. An image forming apparatus in which a plurality of flash lamps mounted at approximately symmetrical positions are alternately lit for exposure of an original to obtain a copied image on a light sensitive film, each of said flash lamps providing substantially the same exposure output, an exposure system characterized in that distribution of exposures effectuated by said lamps disposed at the positions symmetrical to each other is made asymmetrical, wherein the total amount of exposure at a portion of the original undergone the most intensive exposure by the flash lamp lit first becomes minimum, while the total amount of exposure at a portion of the original undergone the least intensive exposure by the flash lamp lit first becomes maximum.

4,978,995

IMAGE FORMING APPARATUS HAVING MEANS FOR DETECTING LOADED UNIT

Harumi Takahashi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 399,154

Claims priority, application Japan, Sep. 9, 1988, 63-224692

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—206 **10 Claims**

1. An image forming apparatus comprising:

a main body;

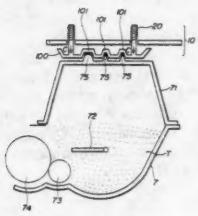
at least one maintenance unit which is loaded into a predetermined position within said main body, said maintenance unit being detachable from the predetermined position;

holding means for holding said maintenance unit in the predetermined position by applying a predetermined pressure on said maintenance unit;

a first engaging part formed on said maintenance unit;

a second engaging part formed on said holding means and having a pressure conductive material provided thereon, said first and second engaging parts having shapes such

that one fits into the other when said maintenance unit is in the predetermined position; and



detecting means for detecting whether or not said maintenance unit is in the predetermined position by detecting a change in a resistance of said pressure conductive material.

4,978,996

ERASER TURN-ON CONTROL FOR A COPIER

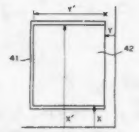
Hiroyuki Akamatsu, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

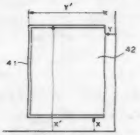
Continuation of Ser. No. 191,251, May 6, 1988, abandoned. This application Aug. 21, 1989, Ser. No. 396,827

Claims priority, application Japan, May 6, 1987, 62-108833

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—231 **3 Claims**





1. A photocopier machine comprising:

a platen for receiving an original document;

a cover plate for selectively covering said platen;

imaging means for imaging an image of said document;

a photoconductive element for receiving said image;

charging means for charging said photoconductive element;

developing means for developing the image formed on said photoconductive element;

an eraser for removing charges deposited on said photoconductive element which do not represent part of the image, said eraser being formed of a plurality of light emitting elements extending across the width of said photoconductive element; and

control means for selectively actuating said light emitting elements of said eraser so as to selectively erase charges on the photoconductive element depending upon the position of said cover plate such that charges in an area of the photoconductive element corresponding to an area outside of the border of a paper sheet to which the developed image is transferred are erased when said cover plate is down, and that charges in an area of the photoconductive element corresponding to an area inside the border of the paper sheet are erased when said cover plate is up.

4,978,997

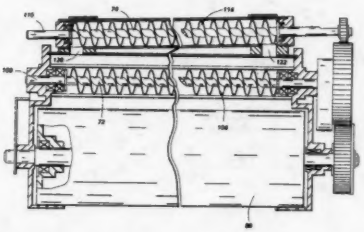
CROSSMIXING DUAL AUGER SYSTEM

Conrad J. Bell, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 2, 1989, Ser. No. 360,809

Int. Cl.[5] G03G *15/09*

U.S. Cl. 355—253 **6 Claims**



1. In a development system including a developer roll adapted for depositing developer material on an imaging surface having an electrostatic latent image thereon, a dual auger system for mixing said developer material and transferring mixed developer to said developer roll, said dual auger system comprising a first auger aligned in a horizontal plane and adapted to mix and supply developer material to said developer roll, a second auger, adjacent to said first auger and positioned along a nonhorizontal plane so that adjacent ends of said first and second auger are separated by vertical distances, said augers having a plurality of toner transport communication apertures at said auger ends whereby toner is transported from one auger to the other by gravitational forces.

4,978,998

IMAGE TRANSFERRING DEVICE FOR IMAGE FORMING EQUIPMENT

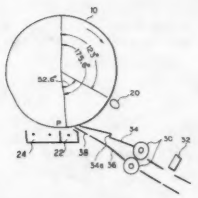
Hideo Aizawa, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 20, 1990, Ser. No. 512,150

Claims priority, application Japan, Apr. 24, 1989, 1-101795; Feb. 20, 1990, 2-37462

Int. Cl.[5] G03G *15/14*

U.S. Cl. 355—273 **4 Claims**



1. A device for use in image forming equipment for transferring a toner image developed by a developing device on a photoconductive element to a paper sheet which is transported to an image transfer station by a register roller pair and guide means having a discontinuous portion, said device comprising:

pre-transfer discharging means adjoining a peripheral surface of the photoconductive element and located between the developing device and the image transfer station; and

transferring and separating means for transferring the toner image to the paper sheet and separating said paper sheet from the photoconductive element;

said pre-transfer discharging means having been turned off

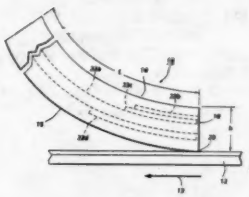
when a leading edge portion of the paper sheet moves away from the discontinuous portion of the guide means and a portion of the photoconductive element that should reach the image transfer station moves away from a position where said pre-transfer discharging means acts.

4,978,999

FIBER REINFORCED CLEANING BLADE

Neil A. Frankel, Rochester; Nero R. Lindblad, Ontario; Herbert C. Relyea, Webster, and Robert J. Meyer, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 17, 1989, Ser. No. 338,698
Int. Cl.[5] G03G *21/00*; B32B *9/00*
U.S. Cl. 355—299 **11 Claims**



1. In an electrostatographic device, a cleaning blade for frictional cleaning engagement with an imaging surface moving in a process direction to remove residual toner therefrom, said cleaning blade comprising:

a blade body formed from an elastomeric matrix material, having a generally rectangular cross section including upper and lower parallel surfaces, and a leading face, said leading face and lower surface forming a cleaning edge;

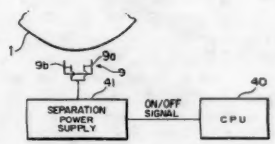
a fiber reinforcement material, mixed with said elastomeric matrix material, fibers of the fiber reinforcement materials having a generally unitary orientation through said elastomeric matrix material, whereby said fibers are oriented parallel to said upper and lower parallel surfaces and perpendicular to said leading face.

4,979,000

PAPER SEPARATING CHARGER CAPABLE OF DISCHARGING CURRENTS OF VARIOUS DUTY FACTORS AND FREQUENCIES

Jun-ichi Hamada; Masahiko Itaya, and Mitsuo Motohashi, all of Hachioj, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Sep. 1, 1989, Ser. No. 402,459
Claims priority, application Japan, Sep. 20, 1988, 63-236721
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—315 **8 Claims**



1. An electrophotographic image forming apparatus for forming an image on a transfer material, comprising:

image holding means for holding a toner image thereon,

developing means for forming said toner image on said image holding means,

image transfer means for electrostatically transferring said toner image from said image holding means to said transfer material,

separation means for separating said transfer material, which is attached to said image holding means, from said image holding means, by means of a discharge signal, and

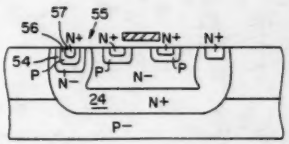
generating means coupled to said separation means for generating a discharge signal including at least alternating currents at various duty factors and for applying said discharge signal to said separation as said transfer material advances relative to said separation means.

4,979,001

HIDDEN ZENER DIODE STRUCTURE IN CONFIGURABLE INTEGRATED CIRCUIT

Martin J. Alter, Los Altos, Calif., assignor to Micrel Incorporated, Sunnyvale, Calif.

Filed Jun. 30, 1989, Ser. No. 374,512
Int. Cl.[5] H01L *29/90*
U.S. Cl. 357—13 **37 Claims**



1. A diode structure comprising:

a first conductivity type region of said diode formed in a sinker region of a vertical transistor,

said sinker region acting as a second conductivity type region of said diode,

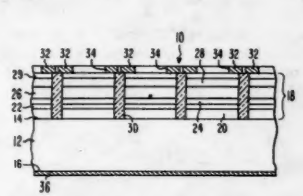
said vertical transistor being incorporated in a configurable integrated circuit.

4,979,002

OPTICAL PHOTODIODE SWITCH ARRAY WITH ZENER DIODE

Jacques I. Pankove, Boulder, Colo., assignor to University of Colorado Foundation, Inc., Boulder, Colo.

Filed Sep. 8, 1989, Ser. No. 404,701
Int. Cl.[5] H01L *33/00*
U.S. Cl. 357—17 **18 Claims**



1. An optical switching device comprising:

a body of a semiconductor material having four regions extending thereacross forming two outer regions and two inner regions with adjacent regions being in contact with each other, said regions being of alternating opposite conductivity type so that adjacent regions form PN junctions therebetween, said regions being capable of emitting light in response to an optical input when an electrical bias is applied across the regions; and

a fifth region extending across and contiguous with one of the outer regions, said fifth region being of a conductivity type opposite that of the one outer region and forming a Zener diode therewith for limiting the voltage drop across

the regions when the switching device is biased to its light emitting condition.

4,979,003

FIELD EFFECT TRANSISTOR AND PROCESS FOR THE PRODUCTION OF A FIELD EFFECT TRANSISTOR

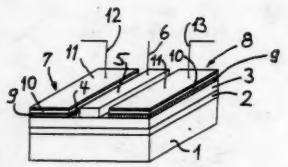
Peter Wennekers, Freiburg, Fed. Rep. of Germany, assignor to Fraunhofer-Gesellschaft Zur Forderung der Angewandten Forschung E.V., Munich, Fed. Rep. of Germany

Filed Nov. 16, 1989, Ser. No. 437,700

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1988, 3842863

Int. Cl.[5] H01L *29/80, 29/161, 23/48*

U.S. Cl. 357—22 **5 Claims**



1. Field effect transistor comprising a layer sequence of a semi-insulating substrate, an epitaxially grown undoped gallium-aluminum-arsenide or gallium-arsenide buffer layer located on said substrate, a channel layer of a well-conducting doped gallium-arsenide located on said buffer layer, a source electrode and a drain electrode composed of gallium-arsenide cover layer strips which are laterally spaced from one another and located on said channel layer, a gate electrode comprising a metal strip located on said channel layer between said source and drain electrodes, a contact-mediating interlayer of lanthanide-arsenide located between said channel layer and said respective source and drain electrodes, and a vaporized-on non-alloyed metal layer formed on both said source and drain electrodes.

4,979,004

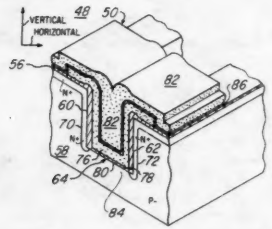
FLOATING GATE MEMORY CELL AND DEVICE

Agerico L. Esquivel, Dallas; Allan T. Mitchell, Garland, and Howard L. Tigelaar, Allen, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 149,744, Jan. 29, 1988, abandoned. This application Jan. 23, 1990, Ser. No. 469,814

Int. Cl.[5] H01L *29/68, 29/06;* **G11C** *11/34*

U.S. Cl. 357—23.5 **21 Claims**



1. A nonvolatile storage device comprising:
a substrate having a trench formed therein;
a first doped region formed on the surface of said trench;
a second doped region formed on the surface of said trench, said second doped region being separated from said first doped region by a channel region said channel region being disposed in said trench;
an insulating layer formed on the surfaces of said trench;
a conductive layer formed on said insulating layer, said conductive layer extending onto the surface of said substrate;
a second insulating layer formed on the surface of said first conductive layer;
a second conductive layer formed on said second insulator layer, said second conductive layer extending onto the surface of said substrate.

4,979,005

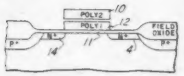
FLOATING-GATE MEMORY CELL WITH TAILORED DOPING PROFILE

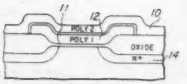
Allan T. Mitchell, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 23, 1986, Ser. No. 889,454

Int. Cl.[5] H01L *29/68, 29/10, 29/78;* **G11C** *11/34*

U.S. Cl. 357—235 **36 Claims**





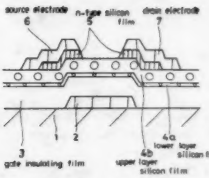
1. A floating-gate memory device comprising:
peripheral transistors and memory transistors, said peripheral transistors comprising n-channel devices, said memory transistors each comprising:
a substrate having a p-type upper portion:
first and second heavily doped n-type source/drain regions separated to define a channel region in said p-type upper portion:
a gate oxide overlying said channel region, and a floating gate overlying said gate oxide:
a control gate overlying and insulated from said floating gate:
wherein the the largest value of the net p-type dopant concentration anywhere within the volume of said p-type upper portion extending from 0 to 0.5 microns directly below the interface between said gate oxide and said channel region
is more than 1.5 times the net p-type dopant concentration in said channel region at the interface between said gate oxide and said channel region:
and wherein the maximum value of net p-type doping concentration within the upper portion of said substrate occurs at a depth which is shallower than the depth of said source/drain diffusions:
and wherein the background value of net p-type doping concentration within the upper portion of said substrate near said memory transistors is greater than the background value of net p-type doping concentration within the upper portion of said substrate near said n-channel peripheral transistors.

4,979,006

REVERSE STAGGERED TYPE SILICON THIN FILM TRANSISTOR

Sakae Tanaka; Yoshiaki Watanabe, both of Tokyo; Katsuo Shirai, and Yoshihisa Ogiwara, both of Tochigi, all of Japan, assignors to Seikosha Co., Ltd. and Nippon Precision Circuits Ltd., both of Tokyo, Japan

Filed May 26, 1989, Ser. No. 358,035
Claims priority, application Japan, May 30, 1988, 63-132093
Int. Cl.[5] H01L 29/78
U.S. Cl. 357—23.7 1 Claim



1. A reverse staggered type silicon thin film transistor, comprising:

a gate electrode on a substrate;

a gate insulating layer on said substrate and said gate electrode, said gate insulating layer having a transistor-forming portion;

a lower layer silicon film on the transistor-forming portion of the gate insulating layer and in contact therewith, said lower layer silicon film being formed at a first temperature;

an upper layer silicon film formed on said lower layer silicon film at a second temperature which is lower than said first temperature, said lower layer silicon film having a first thickness of approximately 30 nm and said upper layer silicon film having a second greater thickness of approximately 120 nm;

an n-type silicon layer on said upper layer silicon film and in contact therewith;

a source electrode on said n-type silicon layer; and

a drain electrode on said n-type silicon layer.

4,979,007

PHOTOELECTRIC CONVERSION DEVICE

Minoru Ogawa; Koichiro Sakamoto; Toshiyuki Tamura, and Kazushige Katsuumi, all of Shizuoka, Japan, assignors to Tokyo Electric Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 61,667, Jun. 15, 1987, abandoned. This application Mar. 28, 1989, Ser. No. 331,079
Claims priority, application Japan, Jun. 17, 1986, 61-140628
Int. Cl.[5] H01L 27/14, 29/78
U.S. Cl. 357—30 6 Claims

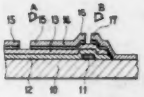
1. An image sensor comprising:

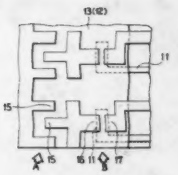
an insulating substrate having a plurality of thin film transistor regions and photosensor regions;

a plurality of gate electrodes for each of the thin film transistor regions provided on a portion of the surface of said substrate by a thin film technique;

a continuous layer of insulating film of SiN_x deposited on said substrate and over said gate electrodes in both the thin film transistor regions and the photosensor regions;

a uniform thickness a-Si film deposited on said insulating SiN_x film for said thin film transistor regions and the photosensor regions and





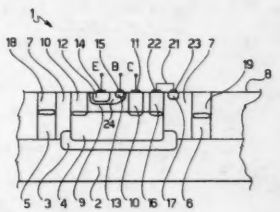
counter electrodes deposited on said a-Si film for said photosensor regions and source and drain electrodes for said thin film transistor regions.

4,979,008

VERTICAL ISOLATED-COLLECTOR TRANSISTOR OF THE PNP TYPE INCORPORATING A DEVICE FOR SUPPRESSING THE EFFECTS OF PARASITIC JUNCTION COMPONENTS

Marco Siligoni, Vittuone, and Flavio Villa, Milan, both of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Milan, Italy

Filed Jan. 18, 1989, Ser. No. 298,651
Claims priority, application Italy, Feb. 4, 1988, 19306 A/88
Int. Cl.[5] H01L 29/72
U.S. Cl. 357—34 4 Claims



1. A vertical isolated-collector transistor of the pnp type incorporating a device for suppressing the effects of parasitic junction components, said transistor comprising a substrate of a semiconductor material having a low concentration of a dopant of a first type, a first layer or bottom well layer extending over the substrate and having a low concentration of a dopant of a second type, a buried intermediate region overlying said first bottom well layer and being higher in concentration of the first-type dopant, an epitaxial layer doped with the second-type dopant and covering the substrate and said region to define a transistor surface, respective emitter, base, and collector regions of said transistor which are separated structurally and formed in said epitaxial layer, and oppositely located isolation zones whose depth extends to the substrate and which are effective to border said regions laterally in the epitaxial layer, the collector region extending in depth to penetrate said intermediate region, characterized in that said device comprises an island region doped of first-type dopant similarly to the collector region and laterally distinct and separate from the collector region and formed in the epitaxial layer between

said collector region and an isolation zone and extending in dept to penetrate said intermediate region.

4,979,009

HETEROJUNCTION BIPOLAR TRANSISTOR

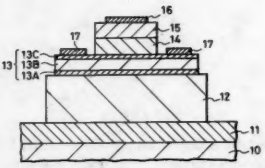
Chushiro Kusano, Tokorozawa; Tomonori Tanoue, Ebina, and Katsuhiko Mitani, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 203,458, Jun. 7, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 415,708

Claims priority, application Japan, Jun. 8, 1987, 62-141465

Int. Cl.[5] H01L *29/261, 29/72, 27/12, 29/205*

U.S. Cl. 357—34 **7 Claims**



1. A heterojunction bipolar transistor wherein a base layer of said transistor includes a thin portion in contact with an emitter layer of said transistor said thin portion having a higher impurity concentration than an intermediate portion of said base layer, and wherein said base layer does not contain a heterojunction therein.

4,979,010

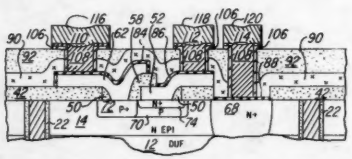
VLSI SELF-ALIGNED BIPOLAR TRANSISTOR

Jeffrey E. Brighton, Stafford, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 334,741, Apr. 5, 1989, abandoned, which is a continuation of Ser. No. 885,995, Jul. 16, 1986, abandoned. This application Aug. 9, 1989, Ser. No. 393,077

Int. Cl.[5] H01L *29/72*

U.S. Cl. 357—34 **12 Claims**



1. A bipolar transistor formed on a transistor region of a semiconductor substrate of a first conductivity type, comprising:

a bureid DUF collector on said substrate and an overlying epitaxial layer both of a second conductivity type;

an isolation region around said transistor region;

an intrinsic base region in said epitaxail layer of a first conductivity type;

an insulating layer over said epitaxial layer having a base contact opening;

a sidewall insulating plug on a sidewall of the insulating layer;

an emitter region of the second conductivity type nested within said intrinsic base region and an overlying emitter polysilicon layer in contact therewith, the emitter polysilicon layer formed in the base contact opening for use as an emitter dopant source for an emitter region below said polysilicon, said sidewall insulating plug used to space the emitter polysilicon layer from an edge of said insulating layer so that an emitter diffusion from said emitter polysilicon into said intrinsic base region is nested within said intrinsic base region due to the spacing effect of the sidewall sidewall insulating plug;

an extrinsic base region adjacent to said emitter region formed in alignment with said emitter polysilicon layer; and

a collector contact region extending through said epitaxial layer to said DUF collector of the second conductivity type.

4,979,011

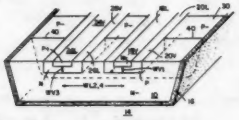
SCR STRUCTURE FOR FAST TURN-ON SWITCHING

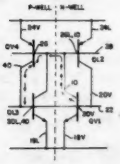
John S. Prentice, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Dec. 15, 1989, Ser. No. 451,249

Int. Cl.[5] H01L *29/74*

U.S. Cl. 357—38 **16 Claims**





1. A latching switch, having an anode, anode gate, cathode gate and cathode, comprising:

a vertical PNP transistor connected in parallel to a lateral PNP transistor by their collectors, bases and emitters;

a vertical NPN transistor connected in parallel to a lateral NPN transistor by their collectors, bases and emitters;

said vertical PNP having its collector and base connected respectively to said base and collector of said lateral NPN;

said lateral PNP having its collector and base connected respectively to said base and collector of said vertical NPN; and

said PNP's emitter being said anode, said PNP's'base being a said anode gate, said NPN's'base being said cathode gate and said NPN's'emitter being said cathode.

13. A latching switch, having an anode region, an anode gate region, a cathode gate region and a cathode region integrated in a substrate, comprising:

a vertical PNP transistor having an N base region formed in a P collector well in said substrate and a P emitter region formed in said N base region;

a vertical NPN transistor having a P base region formed in an N collector well in said substrate and an N emitter region formed in said P base region;

N-type means in said substrate for connecting said N base region tc said N collector well;

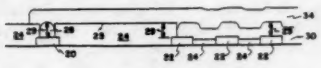
P-type means in said substrate for connecting said P base region to said P collector well; and

said P emitter region being said anode, said N base region being said anode gate, said P base region being said cathode gate and said N emitter region being said cathode.

4,979,012
SEMICONDUCTOR DEVICE WITH BONDING PAD CONTACTS

David J. Brownell, Maple Grove, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 253,789, Oct. 5, 1988, Pat. No. 4,797,375, which is a division of Ser. No. 36,185, Apr. 9, 1987, abandoned, which is a continuation of Ser. No. 658,104, Oct. 5, 1984, abandoned. This application Nov. 21, 1989, Ser. No. 441,335
Int. Cl.[5] H01L *27/02*
U.S. Cl. 357—40 5 Claims



1. An integrated circuit semiconductor device having a principal surface, comprising:

a metal interconnection line on said principal surface, said line having a line width and connecting selected portions of said integrated circuit;

a substantially rectangular metal interconnect pad located on said principal surface and connected to said metal interconnection line, said pad being substantially larger in width and in length than said line width, wherein said pad includes:

an array of spaced metal contacts arranged in an area, said area having a center, the most remote of said metal contacts from said center of said metal contacts approximately defining the perimeter of and said width and length of said pad, each of said metal contacts having a contact length substantially parallel to said pad length and a contact width substantially parallel to said pad width, and each being in contact with said principal surface, wherein said contact width of each of said metal contacts is no larger than four times said line width;

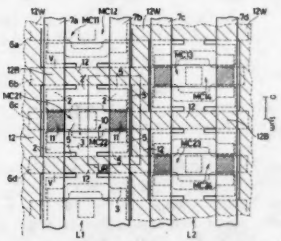
a dielectric material which fills spaces between adjacent of said metal contacts; and

a layer of metal overlying substantially all of and in contact with each of said metal contacts in said array.

4,979,013
SEMICONDUCTOR MEMORY DEVICE

Kiyohiro Furutani; Koichiro Mashiko, and Kazutami Arimoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 25,717, Mar. 13, 1987, abandoned. This application May 8, 1989, Ser. No. 348,188
Claims priority, application Japan, Mar. 13, 1986, 61-56120
Int. Cl.[5] H01L *27/02, 29/06, 29/68;* G11C *11/24*
U.S. Cl. 357—55 21 Claims



2. A semiconductor memory device having a memory cell array of a folded bit line configuration, comprising;

a semiconductor substrate,

memory cells arranged generally in rows and columns to form a matrix, each memory cell comprising a transfer gate and a data charge storage capacitor, the transfer gate being formed of a transistor formed in said substrate and having a pair of source/drain regions and a channel with two sides,

word lines extending in parallel with each other and in a first direction, and passing over the channels of the transistors,

bit lines extending in parallel with each other and in a second direction substantially orthogonal to the first direction, every two bit lines adjacent to each other forming a folded bit line pair,

every two memory cells adjacent to each other forming a pair of memory cells sharing a contact hole for connection with a bit line,

the memory cell pair being arranged in lines parallel with the word lines, with the transistors of first memory cells of the respective memory cell pairs in a memory cell pair line having its channel positioned under one of the word lines to be controlled by it, and transistors of second memory cells of the respective memory cell pairs in the same memory cell pair lines having its channel positioned under another word line adjacent to said one of the word lines, to be controlled by said another word line,

the memory cell pair lines adjacent to each other being separated by trenches with an isolation layer at the bottom of said trench, and memory cell pairs adjacent to each other in the same memory cell pair line being separated from each other by trenches with an isolation layer at the bottom of the trench, so that each of the memory cell pairs are surrounded by trenches with an isolation layer at the bottom of the trench,

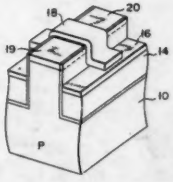
said data charge storage capacitor of each memory cell having electrodes formed on the entirety of the sidewalls of the trench surrounding the memory cell pair except a part of said trench where an isolation oxide film is formed on the sidewall of said trench, the isolation oxide film separating the two memory cells from each other; and

wherein an isolation oxide film is provided on the two sides of the channel of the transistor.

4,979,014
MOS TRANSISTOR

Katsuhiko Hieda, Yokohama; Fumio Horiguchi, and Hidehiro Watanabe, both of Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 5, 1988, Ser. No. 228,519
Claims priority, application Japan, Aug. 10, 1987, 62-198102
Int. Cl.[5] H01L *29/06, 27/01, 27/02*
U.S. Cl. 357—56 11 Claims



1. An MOS transistor comprising:

a semiconductor substrate having a projection and a first conductivity type on a major surface thereof, said projection having an upper surface and opposite side surfaces substantially perpendicular to said upper surface;

a gate insulating film formed on said upper and side surfaces of said projection;

source and drain regions formed on the upper surface of said projection and separated from each other while sandwich-

ing said gate insulating film, said source and drain regions having a second conductivity type;

a gate electrode formed on said gate insulating film and having an upper portion opposing the upper surface of said projection, a pair of opposite side portions opposing the pair of side surfaces of said projection, and corner portions located between the side and upper portions; and

means for applying a voltage to said gate electrode to form adjacent said upper portion a depletion layer extending a first depth into said projection from said upper portion and to form depletion layers extending from said corner portions and connected to each other in said projection at a second depth greater than said first depth.

4,979,015

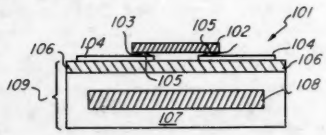
INSULATED SUBSTRATE FOR FLIP-CHIP INTEGRATED CIRCUIT DEVICE

Roger J. Stierman, Richardson; K. Gail Heinen, Dallas; Thomas Ramsey, Garland, and James F. Haefling, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 7,833, Mar. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 57,419, Jun. 3, 1987, abandoned. This application Sep. 16, 1988, Ser. No. 246,130

Int. Cl.[5] H01L *23/48, 29/44, 29/52, 29/60*

U.S. Cl. 357—69 **28 Claims**



1. A flip-chip substrate comprised of:

a layer of silicon carbide;

an insulating layer deposited on the upper surface of the silicon carbide layer, wherein the insulating layer is for supporting metallized circuitry to which a flip-chip can be attached, the insulating layer having a thickness substantially less than the thickness of the silicon carbide layer.

4,979,016

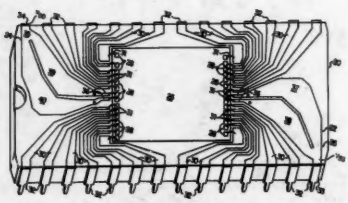
SPLIT LEAD PACKAGE

Robert D. Lee, Denton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed May 16, 1988, Ser. No. 194,405

Int. Cl.[5] H01L *23/48, 29/44*

U.S. Cl. 357—70 **8 Claims**



1. In a muiti-layer integrated circuit package having multiple external pins, the improvement comprising:

first and second bifurcated leads, on separate respective layers of said package, connected in parallel so that each extends from a respective one of said external pins of said integrated circuit package to connect to plural wire bonding sites inside said integrated circuit package,

said bifurcated leads each having one joined end and multiple split ends, respective ones of said ends of said bifurcated leads being connected in parallel so that

a first one of said wire bonding sites is connected to a first split end of said first bifurcated lead and to a first split end of said second bifurcated lead,

a second one of said wire bonding sites is connected to a second split end of said first bifurcated lead and to a second split end of said second bifurcated lead,

and said respective external pin is connected to said joined end of said first bifurcated lead and to said joined end of said second bifurcated lead.

4,979,017

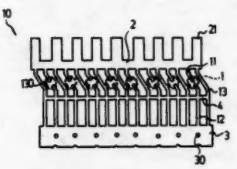
SEMICONDUCTOR ELEMENT STRING STRUCTURE

Adam Mii, 3 Fl., No. 1, Fu Hsing N. Rd., Taipei, Taiwan

Filed Feb. 23, 1989, Ser. No. 314,713

Int. Cl.[5] H01L *23/48*

U.S. Cl. 357—70 **3 Claims**



1. A semiconductor element string comprising:

a lead frame and a plurality of semiconductor elements arranged thereon in an array,

said lead frame comprising

a transverse plate at one side of said array of semiconductor elements and an assembling plate at the other side thereof,

said lead frame further comprising, corresponding to each of said semiconductor elements,

a first lead bridging said semiconductor element and said transverse plate,

a second lead bridging said semiconductor element and said assembling plate, and

a third lead which is respectively connected to said semiconductor element, said transverse plate and said assembling plate,

said lead frame further comprising

a linking piece between said array of semiconductor elements and said assembling plate, said linking piece interconnecting all said second leads and said third leads.

4,979,018

SEMICONDUCTOR DEVICE WITH PARALLEL MULTIPLIER USING AT LEAST THREE WIRING LAYERS

Shigeru Tanaka, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 14, 1989, Ser. No. 407,152

Claims priority, application Japan, Dec. 16, 1988, 63-318235

Int. Cl.[5] H01L *23/48*

U.S. Cl. 357—71 **13 Claims**

1. A semiconductor device with a parallel multiplier comprising:

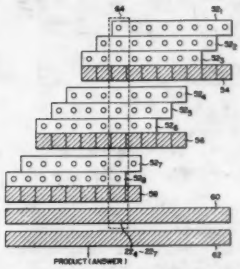
a plurality of partial product producing means for forming partial products by multiplying one of a multiplier and a

multiplicand by a specific bit of the other of the multiplier and multiplicand;

a plurality of first connection and wiring means having two sets of ends, the first set of ends being connected to said plurality of partial product producing means to receive the partial products formed by said partial product producing means;

at least two first partial sum producing means connected to the second set of ends of said first connection and wiring means for adding specific bits of said partial product producing means in blocks;

at least two second connection and wiring means having two sets of ends, the first set of ends being connected to said first partial sum producing means to receive results of addition obtained from said first partial sum producing means; and



second partial sum producing means connected to the second set of ends of said second connection and wiring means for adding together the results of addition in blocks obtained from said first partial sum producing means,

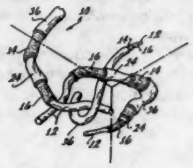
said first and second connection and wiring means being formed on a first metal wiring layer for transmitting results obtained from said plurality of partial product producing means in a first direction and a second metal wiring layer formed above said first metal wiring layer for transmitting said results in a second direction nonparallel to said first direction, and at least one of said first and second connection and wiring means further comprising a third metal wiring layer formed above said second metal wiring layer.

4,979,019

PRINTED CIRCUIT BOARD WITH INORGANIC INSULATING MATRIX

Edward L. Paquette, Claremont; William C. Riley, Palos Verdes Estates; Paul A. Taparauskas, Solana Beach, and James W. Warren, Woodland Hills, all of Calif., assignors to Refractory Composites, Inc., Whittier, Calif.

Filed May 11, 1988, Ser. No. 193,519
Int. Cl.[5] H01L *39/02*
U.S. Cl. 357—80 **30 Claims**



1. In combination,

a support base made from fibers covered by electrically insulating inorganic materials and having a particular coefficient of thermal expansion,

a layer of an electrically conductive material disposed on the support base,

a layer of an insulating ceramic dielectric layer disposed on the layer of conductive material,

an electrically conductive material disposed on the ceramic dielectric layer in a pattern to define a printed circuit,

dielectric material filling the areas between the electrically conductive material defining the printed circuit, and

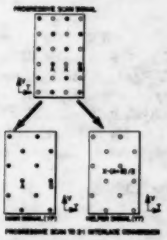
an integral circuit chip disposed on the layer formed by the printed circuitry and the dielectric material, the integrated chip having electrical terminals connected to the printed circuit, the support base having substantially the same coefficient of thermal expansion as the integrated circuit chip.

4,979,020

TELEVISION SIGNAL ENCODED WITH AUXILIARY VERTICAL-TEMPORAL INFORMATION

Michael A. Isnardi, Plainsboro, N.J., assignor to General Electric Company, Princeton, N.J.

Filed Dec. 29, 1987, Ser. No. 139,337
Claims priority, application United Kingdom, Sep. 14, 1987, 8721565
Int. Cl.[5] H04N *11/00, 11/12, 7/04*
U.S. Cl. 358—12 **16 Claims**



1. A system for processing a television-type signal comprising:

means for providing an initial television-type signal with a progressive scanning format;

means for converting said initial progressive scanning television signal to one with an interlaced scanning format, said converted interlaced television signal subject to being re-converted to a progressive scanning format; wherein to facilitate such re-conversion said system includes

means responsive to said initial television signal for developing an auxiliary signal component comprising first frame difference information derived from first and second adjacent progressive scan frames of said initial television signal, and second frame difference information derived from said second frame and an adjacent third progressive scan frame of said initial television signal wherein said auxiliary signal and said converted TV signal are combined in a single signal channel.

4,979,021

OPTICAL CHROMAKEY FIELD

Milton L. Thomas, 1686 Pineridge Dr., Atlanta, Ga. 30324

Filed Nov. 30, 1989, Ser. No. 443,139
Int. Cl.[5] H04N *9/75, 5/222*
U.S. Cl. 358—22 **17 Claims**

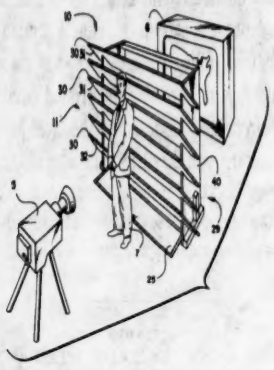
1. Apparatus for causing a video camera to produce a video signal to selectively cue a special effect, comprising:

transparent means having a front side for placement in the field of view of a video camera, having a back side, and

being transparent so as to permit visual sighting from the front side of objects located behind the means; and

illumination means selectively operative to illuminate the transparent means;

whereby the transparent means presents light of a certain



color for reception by the video camera selectively causing the video camera to produce a characteristic video signal operative to cue the special effect while permitting a person on-camera in front of the transparent means to see through the transparent means so as to view objects located behind the transparent means.

4,979,022

PROCESSING OF COLOR VIDEO SIGNALS

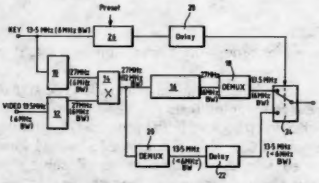
Martin G. Snashall, Reading; Mark R. Andrews, Northampton, and David F. Levy, Andover, all of United Kingdom, assignors to Abekas Video Systems Limited, United Kingdom

Filed Sep. 14, 1989, Ser. No. 407,265

Claims priority, application United Kingdom, Sep. 21, 1988, 8822162.7

Int. Cl.[5] H04N *5/265, 9/75*

U.S. Cl. 358—22 **14 Claims**



1. An apparatus for keying a digital color video signal stream with a digital keying signal, which comprises:

means to receive the digital color video signal stream and the digital keying signal and for increasing the sampling frequency thereof by interpolating intermediate digital words from the values of at least adjacent digital words in the stream and in the keying signal, respectively;

means for combining the color video signal stream of increased sampling frequency with the keying signal of increased sampling frequency to provide a keyed signal at said increased sampling frequency and of increased bandwidth;

first means to receive the keyed signal and for reducing the sampling frequency and bandwidth of the keyed signal to that approximating the incoming signal stream;

means for detecting the frequency of the keying signal and for transmitting the output from the reducing means as an output keyed signal only in the event that the detected frequency exceeds a preset limit.

4,979,023

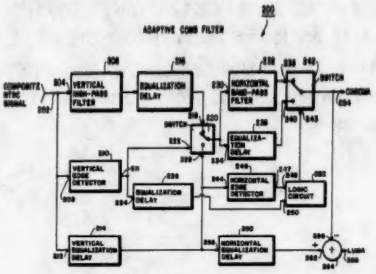
ADAPTIVE COMB FILTER FOR ARTIFACT-FREE DECODING

Mikhail Tsinberg, 363 W. 261 St., Bronx, N.Y. 10471; Alan P. Cavallerano, 10-9 Nicole Cir., Ossining, N.Y. 10562, and Carlo Basile, 29-03A 159th St., Flushing, N.Y. 11358

Division of Ser. No. 134,713, Dec. 18, 1987, Pat. No. 4,847,682. This application Mar. 30, 1989, Ser. No. 330,844

Int. Cl.[5] H04N *9/78*

U.S. Cl. 358—31 **1 Claim**



1. An apparatus for separating luminance and chrominance components from a composite signal, said apparatus comprising:

(a) means for detecting the presence or absence of horizontal edges in said composite signal;

(b) means for detecting the presence or absence of vertical edges in said composite signal;

(c) means for providing vertical filtering only, to said composite signal in the presence of horizontal edges and in the absence of vertical edges;

(d) means for providing both vertical and horizontal filtering in the absence of vertical and horizontal edges; and

(e) means for providing horizontal filtering only, to said composite signal in the presence of both horizontal and vertical edges.

4,979,024

VERTICAL CONTOUR ENHANCEMENT SUPPRESSION CIRCUIT

Takeshi Misawa, and Youichi Sawachi, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 11, 1989, Ser. No. 405,226

Claims priority, application Japan, Sep. 19, 1988, 63-232217; Sep. 19, 1988, 63-232218; Sep. 19, 1988, 63-232219

Int. Cl.[5] H04N *5/208, 9/64*

U.S. Cl. 358—37 **3 Claims**

1. A vertical contour enhancement suppression circuit in system which performs vertical contour enhancement by subtracting a prescribed component of a video signal between horizontal scanning lines and adding a signal representing the result of subtraction to a prescribed component of the video signal, said circuit comprising:

means for detecting a portion at which the level of said signal to be added is negative; and

means for suppressing the adding processing in response to detection of the portion at which the level of the signal to be added is negative.

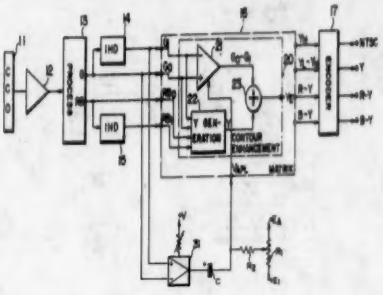
2. A vertical contour enhancement suppression circuit in system which performs vertical contour enhancement by subtracting a prescribed component of a video signal between horizontal scanning lines and adding a signal representing the result of subtraction to a prescribed component of the video signal, said circuit comprising:

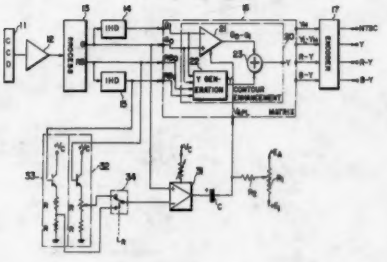
means for detecting a portion at which the level of a red-component signal in said video signal is relatively high; and

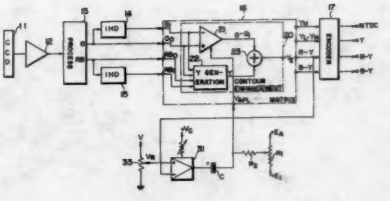
means for suppressing the adding processing in response to

detection of the red-component signal having the relatively high level.

3. A vertical contour enhancement suppression circuit in system which performs vertical contour enhancement by subtracting a prescribed component of a video signal between horizontal scanning lines and adding a signal representing the







result of subtraction to a prescribed component of the video signal, said circuit comprising:

means for detecting a portion at which the level of a signal R-Y derived from said video signal is relatively high; and

means for suppressing the adding processing in response to detection of the portion at which the level of the signal R-Y is relatively high.

4,979,025

CARRIER CHROMINANCE SIGNAL PROCESSING CIRCUIT

Yutaka Ichinoi, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Sep. 1, 1988, Ser. No. 239,593

Claims priority, application Japan, Sep. 4, 1987, 62-222786

Int. Cl.[5] H04N 9/68

U.S. Cl. 358—40 **14 Claims**

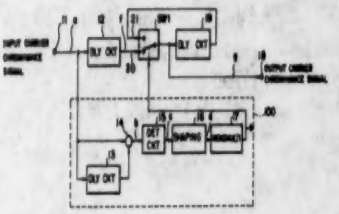
1. A carrier chrominance signal processing circuit comprising;

first means for detecting an edge of color in an input carrier chrominance signal;

second means for holding color information on the input carrier chrominance signal in a vicinity of the edge of color;

third means for producing a control signal having a predetermined pulse width in response to the detected edge of color; and

fourth means for selecting a held color information from said second means when the control signal is applied thereto so



that a steepened carrier chrominance signal is outputted from the fourth means and for selecting the input carrier chrominance signal applicable to said second means for holding when no control signal is applied thereto.

4,979,026

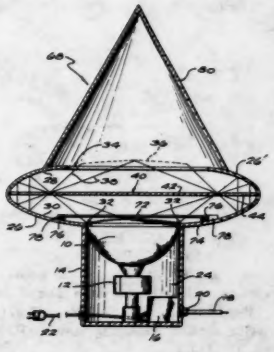
POLARIZED LIGHT 360 DEGREE VIEWING SYSTEM

Paul W. Lang, and Franklin C. Gribshaw, both of P. O. Box 7194, Orange, Calif. 92613

Continuation-in-part of Ser. No. 326,173, Mar. 17, 1989, which is a continuation-in-part of Ser. No. 320,289, Mar. 7, 1989. This application Sep. 20, 1989, Ser. No. 410,127

Int. Cl.[5] H04N 9/16

U.S. Cl. 358—64 **22 Claims**



1. A 360° viewing system, comprising:

an optical system for continuously projecting a real image in space;

means for rotating the real image in space at a given number of revolutions per minute; and

a polarized light shutter including a rotatable polarized screen which rotates in synchronization with the rotating real image in space, and a stationary polarized screen positioned such that the real image in space may be viewed externally of the 360° viewing system only when the polarities of the two polarized screens match, wherein the rotatable and stationary polarized screens are configured to permit the real image in space to be viewed in a selected orientation at all points about the 360° viewing system.

4,979,027

IMAGE READING APPARATUS HAVING AMPLIFICATION FACTORS VARY IN RESPONSE TO A SPATIAL FREQUENCY OF AN INPUT IMAGE SIGNAL

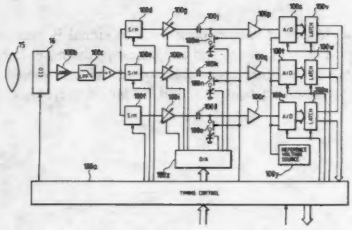
Masanori Sakai, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,500

Claims priority, application Japan, Jul. 15, 1987, 62-177604; Jul. 15, 1987, 62-177605

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **16 Claims**



1. An image reading apparatus comprising:

reading means for photoelectrically reading an original image and outputting an image signal representing the original image; and

amplifying means for amplifying the image signal output from said reading means, said amplifying means being arranged such that an amplification factor thereof varies in response to a spatial frequency of an image represented by the input signal to be amplified, the amplification factor increasing as the spatial frequency increases, and the amplification factor decreasing as the spatial frequency decreases.

4,979,028

VIDEO TELEPHONE

Toru Minematsu, and Haruki Nagayama, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 22, 1989, Ser. No. 354,821

Claims priority, application Japan, May 30, 1988, 63-132101; May 31, 1988, 63-133021

Int. Cl.[5] H04N *7/12, 1/42*

U.S. Cl. 358—85 **12 Claims**

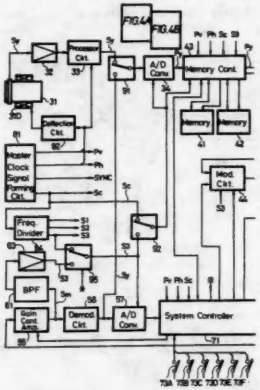
7. A video telephone in which image data of a still picture in a first picture mode and image data of a still picture in a second picture mode are transmitted through a transmission line having an audio frequency bandwidth and in which the second picture mode provides a picture smaller than in the first picture mode, comprising:

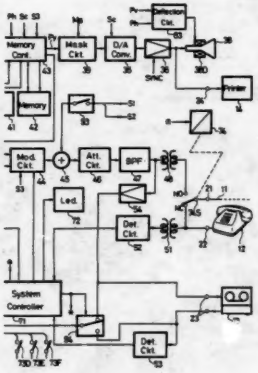
a memory for storing said image data;

means for controlling writing in and reading out of image data from said memory

display means for displaying a respective picture of said first and second picture modes; and

a mask circuit receiving image data from said memory and connected to said display means, whereby read-out image data is supplied through said mask circuit to said display means, said mask circuit being responsive to said means for controlling so that when said image data represents





said second still picture, a picture portion outside said second still picture is masked by predetermined data.

4,979,029

METHOD AND SYSTEMS FOR SCANNING AND INSPECTING IMAGES

Jerome H. Lemelson, 48 Parkside Dr., Princeton, N.J. 08540

Continuation of Ser. No. 906,969, Sep. 15, 1986, which is a continuation of Ser. No. 723,183, Apr. 15, 1985, Pat. No. 4,660,086, which is a continuation of Ser. No. 394,946, Jul. 2, 1982, Pat. No. 4,511,918, which is a division of Ser. No. 13,608, Feb. 16, 1979, Pat. No. 4,338,626, which is a division of Ser. No. 778,331, Mar. 16, 1977, Pat. No. 4,148,061, which is a continuation of Ser. No. 254,710, May 18, 1972, Pat. No. 4,118,730, which is a continuation-in-part of Ser. No. 267,377, Mar. 11, 1963, abandoned, which is a continuation-in-part of Ser. No. 626,211, Dec. 4, 1956, Pat. No. 3,801,379, and a continuation of Ser. No. 477,467, Dec. 24, 1954, abandoned. This application Mar. 27, 1990, Ser. No. 500,288

The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.

Int. Cl.[5] H06N *7/18*

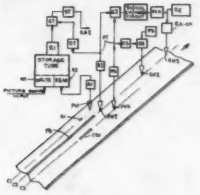
U.S. Cl. 358—93 **16 Claims**

1. A method for inspecting an image field to determine if an

select image phenomenon is present in said image field, comprising:

(a) scanning an image field containing at least one optically contrasting image portion which is detectable with an electro-optical scanning means,

(b) generating first electrical signals which vary in accordance with variations in the optical characteristics of the image field scanned,



(c) analyzing said first electrical signals and generating first information signals corresponding to the optical characteristics of the image field scanned,

(d) electrically comparing said first information signals with signals from recordings in a memory which are indicative of said select image phenomenon, and,

(e) generating digital signals indicative of the presence of said select image phonomenon in said scanned image field.

4,979,030

COLOR DISPLAY APPARATUS

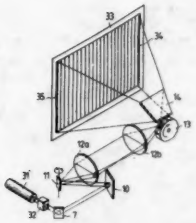
Yasushi Murata, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 19, 1989, Ser. No. 353,941

Claims priority, application Japan, Nov. 30, 1988, 63-303444

Int. Cl.[5] H04N *9/12*

U.S. Cl. 358—56 **15 Claims**



1. A color display apparatus for displaying a color video format signal, comprising:

a two-dimensional screen having a regular pattern of groups of light sensitive luminous elements arrayed in a predetermined direction, each of said groups of luminous elements including a red light sensitive luminous element, a blue light sensitive luminous element, and a green light sensitive luminous element;

a light source for generating a single light beam carrying red, green and blue signals, said single light beam for projection onto said screen;

means for generating horizontal and vertical synchronizing signals from the video format signal;

light-beam deflection means for scanning said two-dimensional screen with said single light beam in synchronism with said horizontal and vertical synchronizing signals; and

modulation means for receiving a drive signal corresponding to a position of the light beam on the screen, and for modulating the intensity of said single light beam in accordance with said drive signal to selectively cause different ones of said groups of luminous elements to luninesce.

4,979,031

DIGITAL COLOR COPYING MACHINE

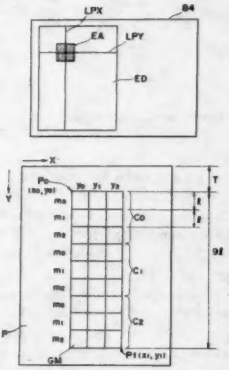
Toshio Tsuboi; Keiji Nakatani, and Shigeru Moriya, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Jul. 11, 1989, Ser. No. 378,299

Claims priority, application Japan, Jul. 12, 1988, 63-173373; Jul. 12, 1988, 63-173374

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **25 Claims**



1. A digital color copying machine comprising:

image reading means for scanning an original document image and generating image data indicating a color;

color altering means for altering said image data;

image forming means for forming the original document image on a recording medium in response to altered image data generated by said color altering means;

mode indicating means for indicating a test mode;

area indicating means for indicating a partial area of the original document image;

memory means for storing a collection of the image data corresponding to the partial area indicated by said area indicating means;

inputting means for manually inputting alteration data related to the color alteration by said color altering means;

test image signal generating means for reading out said collection of image data stored in said memory means, applying said color altering means to it repeatedly, and performing different color alterations on plural collections of the image data repeatedly using the alteration data inputted by said inputting means, thereby generating plural sets of test image data when the test mode is set by said mode indicating means; and

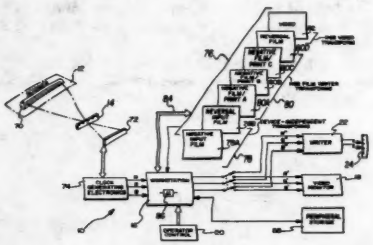
control means for controlling the drive of said image forming means in response to the plural sets of test image data generated by said test image generating means, and for forming on predetermined areas of a recording medium a plurality of images of said partial area which have been subjected to different color alterations.

4,979,032

COLOR IMAGING APPARATUS PRODUCING ON VARIOUS IMAGE RECEPTIVE MATERIALS A VISUALLY MATCHED HARD COPY REPRODUCTION OF A VIDEO IMAGE DISPLAYED

Paula J. Alessi, Webster; Edward J. Giorgianni, and Thomas E. Madden, both of Rochester, all of N.Y., assignors to Eastman Kodak Company

Filed Dec. 27, 1988, Ser. No. 290,677
Int. Cl.[5] H04N 9/11, 1/46
U.S. Cl. 358—76 4 Claims



1. In color image reproduction apparatus including a video monitor for displaying a reproduced image, wherein the improvement comprises:

(a) an input device arranged for producing a set of input signals corresponding to an original image on either (1) a film of the negative type or (2) a film of the reversal type;

(b) a writer device energizable for forming an image on an output film of the negative type or on an output film of the reversal type; and

(c) computer-based control means, having an input coupled to said input device and having respective outputs coupled to said video monitor and to said writer device, for manipulating the set of input signals to form a reproduced image, which is a modification of the original image, on said video monitor and for causing said writer device to form an image (1) directly on output film of the reversal type that is visually matched to the reproduced image displayed on said video monitor, or (2) on output film of the negative type such that when that image is transferred to a print material the image on the print material is visually matched to the reproduced image displayed on said video monitor.

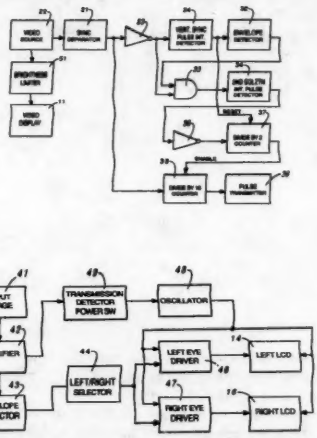
4,979,033

STEREOSCOPIC VIDEO SYSTEM AND METHOD WITH FIELD SYNCHRONIZATION AND INTENSITY CONTROL

Berton H. Stephens, 1024 W. Maude Ave., Suite 208, Sunnyvale, Calif. 94086

Filed Sep. 27, 1988, Ser. No. 249,897
Int. Cl.[5] H04N 13/00
U.S. Cl. 358—92 11 Claims

1. A stereoscopic video system comprising a source of video signals for a picture having left and right images which are displayed during alternate fields with even and odd numbers of equalization pulses occurring respectively during blanking intervals at the outsets of said fields, a video display screen, means responsive to the video signals for displaying the left and right images on the screen during alternate fields of the picture, a pair of glasses with means for presenting the images on the screen alternately to the left and right eyes of a viewer, means including a divide-by-2 counter for monitoring the equalization pulses and providing a control signal which conditions the glasses to present the image on the screen to one eye in response to an even number of said pulses and to the other eye in response to an odd number of said pulses, and means for



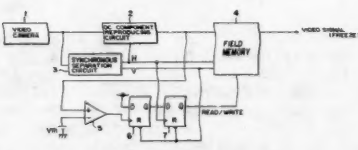
limiting the brightness of the images to which the eyes of the viewer are exposed to prevent flickering.

4,979,034

IMAGE MEMORY APPARATUS

Shinsuke Funaki, Hino, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,477
Claims priority, application Japan, Jul. 21, 1988, 63-183101; Jul. 26, 1988, 63-187279
Int. Cl.[5] H04N 7/18, 7/00
U.S. Cl. 358—93 5 Claims



1. An image memory apparatus comprising: a photographing means for taking an image of a subject and outputting video signals of the image; an image memory means for storing the video signals for the photographing means; a detecting means for detecting changes in brightness level of the video signals from the photographing means; and a control signal generating means for supplying to the image memory means a write control signal according to the level changes of the video signal detected by the detecting means, the apparatus storing the image that exists in a field where the brightness level change in the video signal occurs in memory to freeze that image.

4,979,035

ELECTRONIC ENDOSCOPE APPARATUS WITH CCD OUTPUT CIRCUIT OF POSITIVE POLARITY

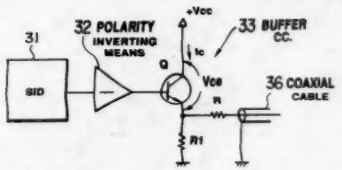
Masao Uehara; Katsuyoshi Sasagawa; Shinji Yamashita; Masahiko Sasaki; Katsuyuki Saito; Masahide Kanoo; Akinobu Uchikubo; Takehiro Nakagawa, all of Hachioji, and Jun Hasegawa, Hino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,952

Claims priority, application Japan, Mar. 22, 1989, 1-69838; Oct. 17, 1989, 1-270996

Int. Cl.[5] A61B 1/04

U.S. Cl. 358—98 11 Claims



1. An endoscope apparatus comprising:

an electronic endoscope including an elongated insert portion, an objective optical system provided on the end of said insert portion, a solid-state imaging chip for conducting photoelectric conversion of an optical image formed through said objective optical system, a charge detection circuit provided around said chip and capable of converting the signal charges obtained through said photoelectric conversion into a voltage level of negative polarity such that the greater the incident light quantity, the lower the output level, light-emitting means provided on one end of said insert portion and capable of emitting light for illuminating a subject, and a polarity inversion means provided around said chip and having an input end DC-coupled to the output end of said charge detection circuit, said polarity inversion mans being capable of inverting the polarity of the output signal of said charge detection circuit into positive polarity and amplifying the signal;

a drive circuit for supplying drive signals to said chip and said charge detection circuit;

a signal transmission cable for transmitting the video signal of the positive polarity output from said polarity inversion means;

signal processing means for processing the video signals of positive polarity transmitted through said signal cable thereby to produce standard video signals; and

display signal means for displaying an image formed by said standard video signals output from said signal processing means.

4,979,036

TELEVISION MOTION DETECTION ARRANGEMENT

Christopher M. Carey Smith, and Franciscus W. P. Vreeswijk, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

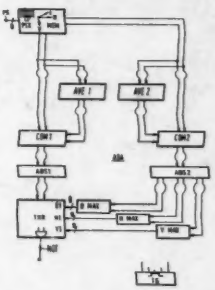
Filed May 23, 1989, Ser. No. 356,037

Claims priority, application Netherlands, May 31, 1988, 8801386; United Kingdom, Sep. 16, 1988, 8821764

Int. Cl.[5] H04N 7/18, 9/64, 5/14

U.S. Cl. 358—105 9 Claims

1. A television motion detection arrangement having at least one television picture store for storing digital picture signal values related to picture elements of an interlaced television picture which on display is formed line-sequentially or horizontally and field-sequentially or vertically, a frame period comprising several field periods, and further including a first picture signal value comparison circuit having inputs coupled to at least outputs of the picture store containing the picture signal values for producing picture signal value differences, a first absolute-value circuit coupled to outputs of the first picture signal value comparison circuit for supplying the picture signal value differences, and an adaptive threshold circuit coupled to outputs of the first absolute-value circuit and to a threshold value-adapting circuit, an output of which is coupled to a threshold value input of the adaptive threshold circuit for the supply of a threshold value which depends on the picture signal value differences, exceeding the adaptive threshold value being an indication of motion, characterized in that the adaptive threshold circuit has at least a horizontal or vertical threshold-value input coupled to an output of a horizontal or vertical maximum-value pass circuit, respectively, which forms part of the threshold value-adapting circuit, inputs of which are coupled via a second absolute-value circuit to outputs of a second picture signal value comparison circuit having inputs coupled, both directly and via a signal combining circuit, to outputs of the picture store, said second picture signal value comparison circuit being operative for the horizontal maximum-value pass circuit with, relative to an instantaneous picture element, substantially adjacent picture elements in the line or horizontal direction and picture element values which are derived via the signal combining circuit from the picture elements of one of the substantially adjacent lines in the television picture, and also for the vertical maximum-value pass circuit with, relative to said instantaneous picture element, substantially adjacent picture elements in the field or vertical direction and picture element values which are derived via the signal combining circuit from the picture elements of one of the substantially adjacent lines in the television picture.



4,979,037

APPARATUS FOR DEMODULATING SUB-NYQUIST SAMPLED VIDEO SIGNAL AND DEMODULATING METHOD THEREFOR

Yosuke Mizutani; Takehiko Asano; Syuji Yanase; Shinichiro Kitagawa, and Akihiko Yamashita, all of Gifu, Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Apr. 14, 1989, Ser. No. 338,088

Claims priority, application Japan, Apr. 15, 1988, 63-94216; Jun. 14, 1988, 63-146311; Jan. 24, 1989, 1-15709

Int. Cl.[5] H04N 7/12, 7/18

U.S. Cl. 358—133 21 Claims

1. An apparatus for reproducing a high definition video signal through decoding of a received subsampled video signal, said subsampled signal being produced by subsampling a high definition video signal at least one time in response to at least one of a signal of an interframe and interfield off-set subsampling frequency causing no aliasing noise in a low frequency range of the subsampled signal, said apparatus comprising:

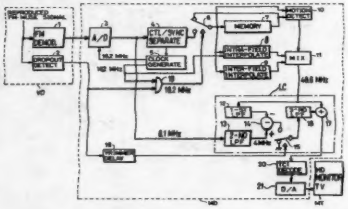
conversion means for converting said subsampled signal to digital data and for deriving digital data of a current field;

switching means for receiving feedback data in which digital data preceding by at least one of substantially two fields

and one field and digital data preceding by at least one of substantially four fields and two fields with respect to said digital data of the current field are alternately arranged and for outputting a data train in which first data corresponding to said current field data and said data preceding by at least one of two fields and one field are alternately arranged, said switching means including first means for deriving said first data corresponding to said current field data from said conversion means and second means for replacing said data preceding by at least one of four and two fields in said feedback data into said first data;

delay means for storing output data from said switching means and for deriving said feedback data train;

intrafield interpolation processing means for receiving data from said switching means and for performing intrafield interpolation processing on data appearing at a timing corresponding to said current field data out of the received data for deriving motion picture data;



still picture deriving means for receiving data from said switching means and for deriving still picture data;

mixing means for mixing said still picture data and said motion picture data at a mixing ratio determined by output data from a motion detecting circuit means for detecting motion of a picture;

low-frequency replacement means for receiving said current field data and composite data and for replacing a low-frequency component of said composite data by a predetermined low-frequency component of said first data;

first inhibiting means for inhibiting said low-frequency replacement in said low-frequency replacement means upon generation of noise including dropout in said subsampled video signal; and

second inhibiting means for inhibiting replacement operation in said second means of said switching means upon generation of said noise.

4,979,038

VARIABLE THRESHOLD QUANTIFICATION PROCESS IN ENCODING BY TRANSFORMATION FOR THE TRANSMISSION OF IMAGE SIGNALS

Jacques Guichard, Paris, and Géard Eude, Torcy, both of France, assignors to Etat Francais represente par le Ministere des Postes, des Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications), Organized under the Law of the French Republic, France

Filed Sep. 18, 1989, Ser. No. 408,294

Claims priority, application France, Sep. 19, 1988, 88 12186

Int. Cl.[5] H04N 7/12

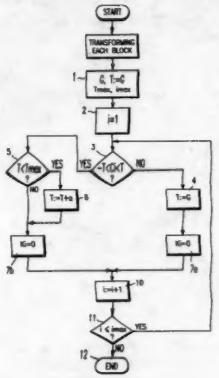
U.S. Cl. 358—133 11 Claims

1. A quantization process for encoding by transformation the transmission on a low rate link of an image signal, the latter being treated ion the form of blocks, each containing a set of digital data organized in matrix form and representing part of an image or a difference between two image parts, comprising the steps of:

transforming each block by a transformation operator to produce a transformed block of transformed coefficients ($C_{1\text{-}N}$) organized in matrix form and representing the frequency components of said image part or said different between two image parts;

applying said quantization process to each transformed block;

performing a comparison of each transformed coefficient of a transformed block being quantized, at the end of a scan of the block with quantization levels; and



wherein the quantization is performed with a quantization step G and a threshold T liable to vary between one transformed coefficient (Ci) and the next coefficient (Ci+1) in the scan, depending on whether the transformed coefficient Ci is higher, lower or equal to said quantization step.

4,979,039

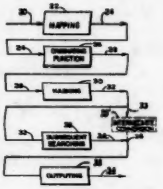
METHOD AND APPARATUS FOR VECTOR QUANTIZATION BY HASHING

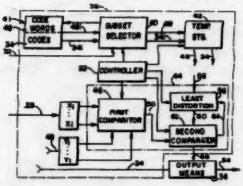
Gregory H. Kisor, West Jordan; James F. Parker, Provo, both of Utah, and Edward J. King, Fremont, Calif., assignors to Information Technologies Research Inc., Utah

Filed Jan. 30, 1989, Ser. No. 303,795

Int. Cl.[5] H04N 7/12

U.S. Cl. 358—133 41 Claims





1. A vector quantizer for data compression of a signal represented by a plurality of binary signal vectors, each signal vector being of a predetermined length and including a plurality of individual sample elements of the signal to be compressed, comprising:

hashing means for hashing each signal vector to generate a value identifying one of at least three different predetermined subsets of predetermined code words, each code word having a length equal to the predetermined length of the signal vectors and each code word having a unique associated binary code, each of the codes having a length less than the predetermined length of the signal vectors and code words; and

output means for outputting from the vector quantizer a code associated with one code word of the one subset to represent the hashed signal vector, the one code word having the least distortion with respect to the hashed signal vector of all of the code words of the one subset.

4,979,040

DECODER FOR SUBSAMPLED VIDEO SIGNAL

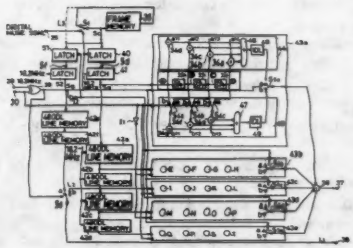
Takahiko Masumoto, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Kawasaki, Japan

Filed Jan. 17, 1990, Ser. No. 466,522

Claims priority, application Japan, Jan. 18, 1989, 1-10320

Int. Cl.[5] H04N 9/64

U.S. Cl. 358—138 **18 Claims**



1. A picture signal interpolation device (43a) responsive to pixel signals sampled based on interline offset subsampling for interpolating a pixel signal between said sampled pixel signals, comprising:

m (m is an integer of 2 or more) cascaded delay means (33h, 33i, 33j) responsive to a predetermined clock signal for delaying said sampled pixel signals;

(m+1) first multiplication means (34a, 34b, 34c, 34d) connected to receive (m+1) pixel signals delayed from said delay means for multiplying each of the (m+1) pixel signals by a predetermined first tap coefficient;

first addition means (46) connected to outputs of said first multiplication means for adding output signals of said first multiplication means;

second multiplication means (34e, 34f, 34g) connected to receive the first or latter m pixel signals delayed from said delay means for multiplying each of the received pixel signals by a predetermined second tap coefficient;

second addition means (47) connected to outputs of said second multiplication means for adding output signals from said second multiplication means;

timing control means (33h, 33i, 33j, 58, S7) responsive to a position of said pixel signal to be interpolated for relatively controlling output timing of said first addition means and that of said second addition means; and

mixing means (S5a) responsive to said clock signal for mixing output signals of said first and second addition means timing-controlled by said timing control means.

4,979,041

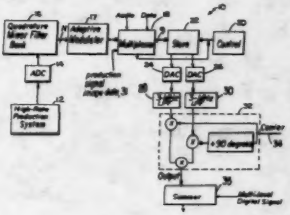
HIGH DEFINITION TELEVISION SYSTEM

William F. Schreiber, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jan. 28, 1988, Ser. No. 149,673

Int. Cl.[5] H04N 7/04

U.S. Cl. 358—141 **54 Claims**



1. A high-definition television system for processing and transmitting a production television signal (e.g., a signal over a channel originating in a television camera or production facility), said system comprising

filter means for spatially filtering said production signal to remove spatial-frequency components, wherein said filter means comprises a bank of two-dimensional filters for generating a plurality of discrete spatial frequency components and wherein said filter means selects a subset of said plurality of discrete spatial frequency components, said subset including more than one and less than all of said plurality of discrete spatial frequency components,

transmission means for transmitting said selected discrete spatial frequency components, using doublesideband quadrature modulation.

4,979,042

APPARATUS FOR CORRECTING SHADING EFFECTS IN VIDEO IMAGES

Richard M. Vogel, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,284

Int. Cl.[5] H04N 5/14

U.S. Cl. 358—163 **8 Claims**

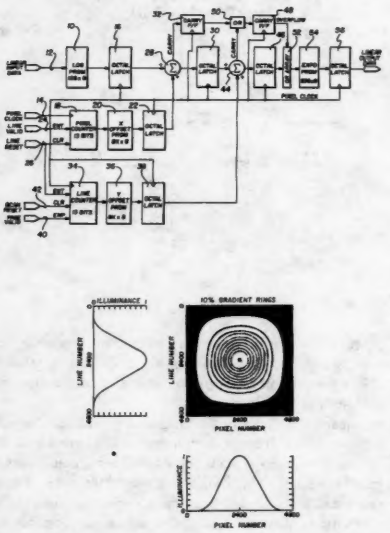
1. An apparatus for compensating for two-dimensional non-uniformities in an optical system at each pixel location along a scan line comprising:

means for establishing multibit correctional data by determining the two-dimensional non-uniformity characteristics in terms of two orthogonal functions extending along two orthogonal axes;

means for storing correctional factors for a first orthogonal direction;

means for storing correctional factors for a second orthogonal direction;

means for accessing said stored correctional factors according to the coordinates of the pixel being processed; and



means for combining the correction factors to obtain a corrected value for the pixel being processed.

4,979,043

VIDEO SIGNAL PROCESSING CIRCUIT

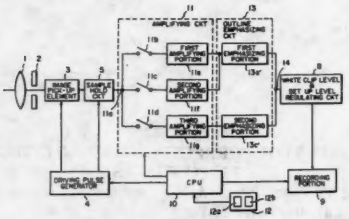
Masahiro Suzuki, Yokohama, and Ryuzo Motoori, Kawasaki, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Aug. 23, 1989, Ser. No. 397,249

Claims priority, application Japan, Aug. 29, 1988, 63-214136

Int. Cl.[5] H04N *5/213, 7/00, 5/52*

U.S. Cl. 358—167 **4 Claims**



1. A video signal processing circuit comprising:

amplifying means including first, second, and third amplifying portions having different amplification factors, respectively;

selecting means for selecting any one of said amplifying portions to amplify a video signal;

outline emphasizing means for processing a video signal from the selected amplifying portion, including a pair of outline emphasizing portions having different degrees of outline emphasis, respectively; and

means for connecting an output of each of said first and second amplifying portions to an input of one of said pair of outline emphasizing portions and for connecting an output of the third amplifying portion to an input of the other of said pair of outline emphasizing portions.

4,979,044

AUTOMATIC CONTRAST CIRCUIT FOR INSTANTANEOUS COMPENSATION

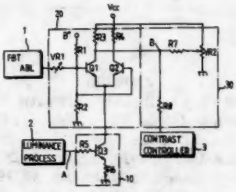
Sung-Pyo Hong, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Feb. 13, 1989, Ser. No. 310,784

Claims priority, application Rep. of Korea, Apr. 2, 1988, 88-3759

Int. Cl.[5] H04N *5/14*

U.S. Cl. 358—168 **2 Claims**



1. An automatic contrast circuit for instantaneous compensation comprising:

a luminance signal amplifying means having a device for amplifying a brightness signal applied thereto from a luminance processing means through a bias resistor;

an automatic brightness limiter circuit included in a flyback transformer for supplying a beam current having a limited brightness;

an inverting amplifier circuit connected between the luminance signal amplifying means and the brightness limiter circuit for producing a composite signal of said beam current and said brightness signal; and

a direct voltage control means connected to the output side of the inverting amplifier circuit for supplying a divided voltage from a voltage source together with the composite signal as a control signal for a contrast controller.

4,979,045

IMAGE SENSOR FOR A MOVABLE ZONE DETECTION ARRAY

Nobuyuki Taniguchi, Nishinomiya; Toshihiko Karasaki, Sakai; Tokuji Ishida, Daito; Masataka Hamada, Osaka, and Toshio Norita, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 5,413, Jan. 20, 1987, Pat. No. 4,835,615.

This application May 18, 1989, Ser. No. 353,813

Claims priority, application Japan, Jan. 21, 1986, 61-11537; Mar. 14, 1986, 61-57855

Int. Cl.[5] H04N *3/14*

U.S. Cl. 358—227 **9 Claims**

1. An image sensor system for sensing an image of an object, comprising:

a multizone detection array for receiving images of a plurality of separate portions of an object and for providing corresponding distinct image signals;

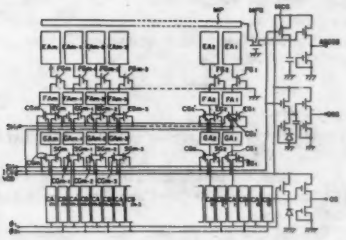
means for amplifying the respective distinct image signals;

means for providing gain control signals for the amplifying means;

means of producing a zone signal corresponding to an image signal, and

multiplexer means, responsive to a zone signal, to effect a switching operation of applying a corresponding gain

control signal to the amplifying means, whereby the gain control of each image signal from a zone of the detection



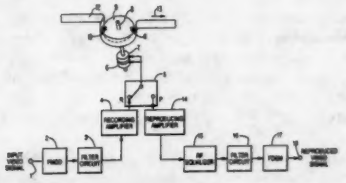
array can be controlled by the average brightness of the corresponding zone.

4,979,046

MAGNETIC RECORDING AND REPRODUCING APPARATUS FOR RECORDING UPPER-SIDEBOND-ELIMINATED FM SIGNAL

Shinichi Aki, Osaka; Masaaki Kobayashi, Kawanishi; Tsutomu Muraji, Osaka, and Akihiro Takeuchi, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 3, 1988, Ser. No. 253,218
Claims priority, application Japan, Oct. 1, 1987, 62-248707
Int. Cl.[5] H04N *9/80*
U.S. Cl. 358—330 **3 Claims**



1. A magnetic recording and reproducing apparatus comprising:

a frequency modulation means for frequency-modulating an input video signal to obtain a frequency-modulated signal;

a filter means for eliminating an upper sideband component of said frequency-modulated signal from said frequency-modulated signal while maintaining the level of a carrier frequency component of said frequency-modulated signal constant;

a recording and reproducing means for recording an output signal of said filter means on a magnetic recording medium and for reproducing the recorded signal from said recording medium; and

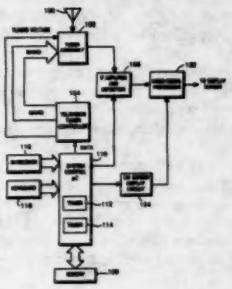
a frequency demodulation means for frequency-demodulating the reproduced signal from said recording and reproducing means to obtain a reproduced video signal.

4,979,047

AUTOMATICALLY ACTIVATED COMMERCIAL MESSAGE TIMER

Charles M. Wine, Princeton, N.J., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Feb. 21, 1989, Ser. No. 312,517
Int. Cl.[5] H04N *5/76*
U.S. Cl. 358—335 **21 Claims**



1. Apparatus for use in a radio frequency (RF) signal receiver, comprising;

data input means for generating data in response to activation by a user;

control means coupled to said data input means for generating a tuning control signal in response to data received from said data input means;

tuning means responsive to said tuning control signal for selecting an RF signal from a plurality of RF signals applied thereto;

memory means coupled to said control means for storing data relating to said tuning control signal;

timing means coupled to said control means for timing a predetermined period and for producing a timing signal;

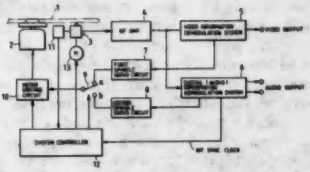
said control means in response to said data from said data input means also causes said memory means to store channel data indicative of a first tuned channel, and causes said timing means to begin timing said time period, and, upon expiration of said time period said control means generates a signal indicative of the expiration of said time period if said tuning means is tuned to a different channel when said time period expires.

4,979,048

APPARATUS FOR AND METHOD OF STOP CONTROL FOR A SPINDLE MOTOR IN A DISK PLAYER

Naoki Shimada; Hidehiro Ishii; Masuhiro Sato, and Masayori Shinohara, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,648
Claims priority, application Japan, Jun. 10, 1988, 63-144544
Int. Cl.[5] H04N *5/76;* **G11B** *7/00*
U.S. Cl. 358—342 **10 Claims**



1. A method of stopping a spindle motor for rotating a

composite disk in a disk player, the composite disk having a first area where information is recorded/reproduced at a first rotational frequency of the composite disk, and a second area where information is recorded/reproduced at a second rotational frequency of the composite disk, the second rotational frequency being greater than the first rotational frequency, the method comprising the steps of:

moving, in response to a stop or an eject command, a pickup for reproducing information recorded on the composite disk to the first area, said moving step being performed only if one of the eject or stop commands is instructed during or after information has been read from the second area;

supplying, simultaneously with said moving step, a counter torque brake signal to the spindle motor, thereby slowing the rotational frequency of the composite disk to a frequency in which information can be read from the first area; and

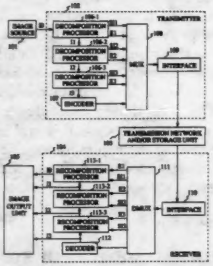
before ejection of said composite disk in response to said eject command, performing a control operation for stopping the spindle motor, said control operation performing step beginning at a point of time when the pickup reproduces information recorded on the first area of the composite disk in accordance with said moving and supplying steps.

4,979,049

EFFICIENT ENCODING/DECODING IN THE DECOMPOSITION AND RECOMPOSITION OF A HIGH RESOLUTION IMAGE UTILIZING ITS LOW RESOLUTION REPLICA

Christodoulos Chamzas, West Long Branch, and Donald L. Duttweiler, Rumson, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 1, 1989, Ser. No. 359,909
Int. Cl.[5] H04N *1/41*
U.S. Cl. 358—426 **26 Claims**



12. Apparatus for encoding pixels in the decomposition of a high resolution image into a low resolution replica and supplemental information for transmission or storage, comprising:

a source of high resolution pixels representative of a high resolution image;

means for generating low resolution pixels from said high resolution pixels to obtain said low resolution replica;

means for utilizing a first group of said low resolution pixels including a current low resolution pixel being processed and for utilizing a second group of said high resolution pixels to determine if one or more high resolution pixels to be recomposed for said current low resolution pixel is non-typically predictable, typically predictable and an exception, or typically predictable and not an exception;

means for generating exception indications for each current low resolution pixel for which said one or more high resolution pixels to be recomposed are determined to be typically predictable and an exception;

means for generating supplemental information for each of said current low resolution pixels for which said one or more high resolution pixels to be recomposed is determined to be either typically predictable and an exception or non-typically predictable; and

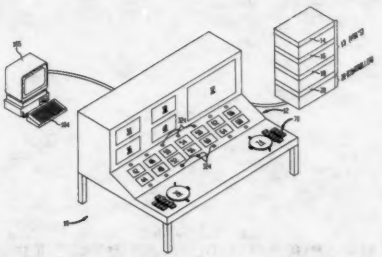
means for supplying as outputs representations of said exception indications, if any, and representations of said supplemental information, if any.

4,979,050

VIDEO COMPOSITION METHOD FOR ASSEMBLING VIDEO SEGMENTS

William F. Westland, Southboro, and James M. Tindell, Boston, both of Mass., assignors to Lex Computer and Management Corporation, Keene, N.H.

Filed Dec. 2, 1983, Ser. No. 556,536
Int. Cl.[5] H04N *5/76*
U.S. Cl. 360—14.1 **4 Claims**



1. A composing method for editing segments from image source material stored in at least one storage medium and for denoting serially connected sequences of said segments, said method comprising the steps of:

selectively displaying segments of said image source material on a pictorial display means;

identifying each segment by a pictorial image segment label;

assembling at least a plurality of said labels for said segments into a label sequence;

operating upon a sequentially related plurality of said labels for said segments as a single label, said single label identifying a plurality of said segments;

combining a sequentially related plurality of said labels for said segments into said single label;

identifying each segment by a pictorial image segment label pair;

said single label is a pictorial image segment label pair selected from the label frames identifying said segments;

providing a plurality of pictorial display screens arranged in a first and a second spaced apart linear array;

providing juxtaposed to each said display screen a cursor position indicating element;

providing said display screens with electrical signals pictorially representing a selected sequence of label pairs, each label pair representing a segment;

displaying on each spatially related pair of said display screens a said label pair, a screen of said first array displaying a beginning label and a spatially related screen of said second array displaying an ending label of said pair; and

said combining step comprising the steps of:

identifying, using said cursor indicating elements, a beginning label of said single label;

identifying, using said cursor identifying elements, a later occurring, ending label of said single label; and

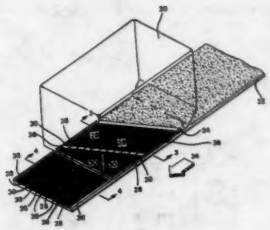
collapsing said beginning label, said ending label, and all labels therebetween into said single label.

4,979,051

BIMODAL MULTI-TRACK MAGNETIC HEAD

James A. Eggebeen, 11323 Vela Dr., San Diego, Calif. 92126

Filed Mar. 22, 1988, Ser. No. 171,842
Int. Cl.[5] G11B *5/02, 5/265*
U.S. Cl. 360—21 **28 Claims**



18. A head assembly for writing servo signals onto a magnetic medium to define a plurality of tracks therein, comprising:

first means for writing a first servo signal onto at least a portion of the magnetic medium, along a first track; and

second means positioned in proximity to the first means for overwriting a second servo signal onto portions of the magnetic medium after the first signal is written thereon, to define a plurality of tracks within the first track.

26. A method of writing servo signals in a plurality of tracks on a magnetic medium by means of a full width write transducer and a multiple track transducer which is positioned in proximity to the full width write transducer the method comprising the steps of:

passing a surface of the magnetic medium adjacent the full width write transducer;

writing a first servo signal through the full width write transducer onto at least a portion of the magnetic medium;

passing said surface of the magnetic medium adjacent the multiple track write transducer; and

overwriting a second signal through the multiple track transducer to define a plurality of servo tracks within the first track on the magnetic medium.

4,979,052

DIGITAL SIGNAL MAGNETIC RECORDING/REPRODUCING APPARATUS

Toyohiko Matsuta; Masafumi Shimotashiro, both of Neyagawa, and Masaaki Kobayashi, Kawanishi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 29, 1988, Ser. No. 251,094
Claims priority, application Japan, Sep. 29, 1987, 62-245126; Oct. 12, 1987, 62-256536; Dec. 17, 1987, 62-319401
Int. Cl.[5] G11B *5/00, 5/09*
U.S. Cl. 360—32 **10 Claims**

1. A digital signal magnetic recording/reproducing apparatus comprising;

encoding means for converting an input digital signal into multi-value digital signals;

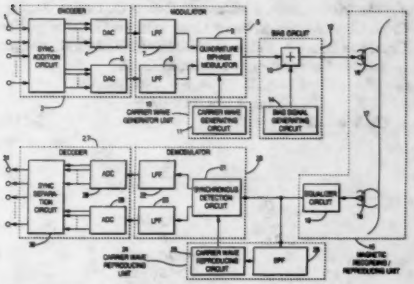
carrier wave generating means for generating a carrier wave;

modulation means for executing a quadrature biphase modulation of an output of said encoding means using the carrier wave to generate a multi-value quadrature amplitude modulated signal;

magnetic recording and reproducing means for recording the multi-value quadrature amplitude modulated signal on a magnetic recording medium and reproducing the recorded signal;

carrier wave reproducing means for reproducing the carrier wave from the reproduced signal from said magnetic recording and reproducing means;

demodulating means for demodulating the reproduced signal from said magnetic recording and reproducing means using the carrier wave reproduced by said carrier wave reproducing means; and



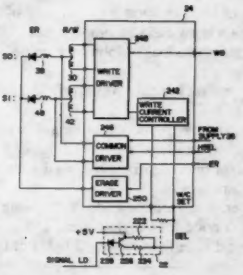
decoding means for decoding an output of said demodulation means to obtain a reproduced digital signal.

4,979,053

METHOD OF CONTROLLING RECORDING MAGNETIC FIELD APPLIED BY GAP OF MAGNETIC HEAD IN ACCORDANCE WITH RECORDING DENSITY OF DISK AND MAGNETIC APPARATUS THEREFOR

Masahiro Kusunoki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 13, 1988, Ser. No. 243,838
Claims priority, application Japan, Sep. 14, 1987, 62-230035
Int. Cl.[5] G11B *5/09, 15/12*
U.S. Cl. 360—46 **19 Claims**



1. A magnetic disk apparatus for reading recorded data from and/or recording write data on a magnetic disk, comprising:

discriminating means for discriminating a recording density of said magnetic disk and outputting recording density data representing the recording density;

selecting means comprising first and second resistive elements and output means for selectively outputting as selection data one of a first current flowing from said first resistive element and a second current flowing from said first and second resistive elements in accordance with the recording density data from said discriminating means;

generation control means for generating and outputting generation control data in accordance with write data and the selection data from said selecting means; and

access means including a read/write head for applying a recording magnetic field generated in a gap of said read/write head to said magnetic disk and for recording the write data on said magnetic disk in accordance with generation control data from said generation control means.

4,979,054

DISK DRIVE FOR STORING DATA IN RUN LENGTH LIMITED FORMAT AND METHOD OF PROVIDING SUCH FORMAT

Robert B. McCullough, Pleasanton; Robert G. Taylor, Jr., Santa Cruz; Glenn M. Stark, Santa Cruz; William G. Swinton, Santa Cruz, and Bruce A. Fairman, Woodside, all of Calif., assignors to Tandon Corporation, MoorPark, Calif.

Filed Feb. 25, 1988, Ser. No. 160,501
Int. Cl.[5] G11B 5/09
U.S. Cl. 360—48 5 Claims

DATA	RLL (2,7) CODE
11	1000
10	0100
000	100100
001	001000
010	000100
0110	00100100
0111	00001000

1. A method of formatting a sector for storage of data on a disk in RLL format comprising the steps of:

writing an identification phase locked loop lock on field having 3 bytes of 00H data;

writing a pre-identification synchronization field having 15 bytes of 00H data;

writing an address mark containing 1 byte of 4BH data converted to an illegal run length limited code, 1008H;

writing an identification field identifier code having 1 byte of FEH data;

writing an identification area having a cylinder number high byte, a cylinder number low byte, a head number byte, and a sector number byte;

writing 2 bytes of cyclic redundancy check code data for the identification area;

writing a post identification field having 3 bytes of 00H data;

writing a data skew field having 3 bytes of 00H data;

writing a data phase locked loop lock on field having 3 bytes of 00H data;

writing a pre-data synchronization field having 15 bytes of 00H data;

writing an address mark containing 1 byte of 4BH data converted to an illegal run length limited code, 1008H;

writing a data field identifier having 1 byte of F8H data;

writing a data area;

writing an error correction code field having 7 bytes of error correction code for the data area; and

writing a post data field having 3 bytes of 00H data.

4,979,055

DISK DRIVE SYSTEM CONTROLLER ARCHITECTURE UTILIZING EMBEDDED REAL-TIME DIAGNOSTIC MONITOR

John P. Squires, Jamestown; Thomas A. Fiers, Longmont, and Louis J. Shrinkle, Boulder, all of Colo., assignors to Conner Peripherals, Inc., San Jose, Calif.

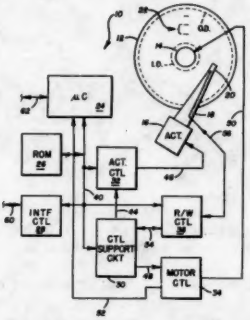
Continuation of Ser. No. 58,289, Jun. 2, 1987, abandoned. This application Oct. 18, 1989, Ser. No. 423,719
Int. Cl.[5] G11B 17/00
U.S. Cl. 360—69 14 Claims

1. A control architecture that provides for the storage and retrieval of data with respect to a rotating media and transfer of data with respect to a host in response to host commands, wherein the data is read and written by a sensor with respect to the rotating media, said control architecture comprising:

(a) a microcontroller; and

(b) a memory containing a control program, said memory being coupled to said microcontroller to permit execution of said control program by said microcontroller, the execution of said control program providing for the performance of a plurality of microcontroller control processes including:

(i) a plurality of first control processes including a spin control process for controlling the spin speed of the rotating media, a positioning control process for controlling the positioning of said sensor and a read/write control process for controlling the reading and writing of data with respect to said rotating media; and



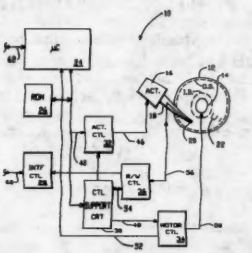
(ii) a plurality of second control processes for controlling said first control processes, said second control processes including an interface control process for controlling said first control processes in the execution of host commands and a monitor control process for the execution of diagnostic commands for controlling said first control processes independent of said host.

4,979,056

DISK DRIVE SYSTEM CONTROLLER ARCHITECTURE

John P. Squires, Jamestown; Thomas A. Fiers, Longmont, and Louis J. Shrinkle, Boulder, all of Colo., assignors to Conner Peripherals, Inc., San Jose, Calif.

Filed Jun. 2, 1987, Ser. No. 57,289
Int. Cl.[5] G11B 15/18, 19/02
U.S. Cl. 360—69 21 Claims



1. A disk drive architecture providing for the controlled storage and transfer of data with respect to a host, said architecture comprising:

(a) a disk for storing data in respective sectors at a surface of said disk, each sector including sector information;

(b) means for rotating said disk in response to spin signals that determine the direction and rotational rate of said disk, said rotating means including means, responsive to spin data values, for providing said spin signals to said rotating means;

(c) means for positioning a head with respect to the surface

of said disk for reading and writing data, said positioning means including actuator means, responsive to a positioning signal, for moving said head with respect to the surface of said disk and means for converting an actuator data value into said positioning signal;

(d) sector means, coupled to said head, for recovering sector information from the sectors on the surface of said disk, said sector means including means for converting said sector information to sector data values including a sector mark signal; and

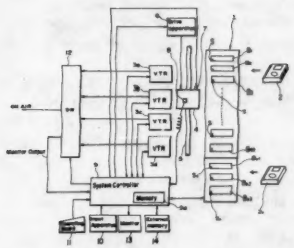
(e) a microcontroller for successively executing a plurality of control processes including sector, spin, and actuator control processes, wherein said spin and actuator control processes respectively provide said spin data values and actuator data values to said rotating means and positioning means, wherein said microcontroller includes timing means, responsive to a plurality of timing control data values, for initiating the execution of said sector, spin and actuator control processes by said microcontroller, and wherein said microcontroller, in response to said sector data values determines and provides said timing control data values to said timing means such that said spin and actuator control processes are initiated at respective predetermined periods after receipt of said sector mark signal by said microcontroller and said sector control process is initiated a predetermined period in advance of the calculated occurrence of the next said sector mark signal.

4,979,057

AUTOMATIC CASSETTE LOADING AND REPRODUCING APPARATUS

Akihiko Matsumoto; Fumihiro Nagasawa, and Kuniharu Onozuka, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 12, 1989, Ser. No. 378,754
Claims priority, application Japan, Jul. 15, 1988, 63-175059
Int. Cl.[5] G11B *15/18, 19/02*
U.S. Cl. 360—71 **16 Claims**



1. An automatic cassette loading and reproducing apparatus comprising:

main storage means for storing a plurality of recorded cassettes for normal use;

cassette reproducing means;

auxiliary storage means for storing at least one recorded cassette for emergency use;

cassette transporting means for selectively transporting said recorded cassettes for normal use and emergency use between said main and auxiliary storage means and said cassette reproducing means; and

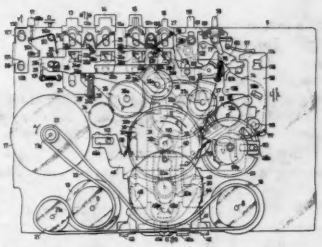
control means for controlling said cassette reproducing means and said cassette transporting means and being programmed for a normal mode in which said cassette reproducing means reproduces said plurality of recorded cassettes for normal use in a predetermined sequence, and an emergency mode which is established upon the placement of a recorded cassette for emergency use in said auxiliary storage means and in which said predetermined sequence is interrupted and said at least one recorded cassette for emergency use is reproduced by said cassette reproducing means.

4,979,058

ROTATION DETECTING DEVICE FOR A TAPE RECORDER

Noriyuki Koga, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 372,533
Claims priority, application Japan, Jun. 28, 1989, 63-159871
Int. Cl.[5] G11B *15/26*
U.S. Cl. 360—74.2 **9 Claims**



1. A rotation detecting mechanism for a tape recorder comprising

a movable shut-off lever for setting at least one of a reproducing lever and a head base at a stop state position, one of said reproducing lever and the head base being previously set to the reproducing state position,

a movable changeover lever for interchangeably setting one of a normal reproducing direction and a reverse reproducing direction of a magnetic tape,

switching means for selectively shifting and setting one of said shut-off lever and said changeover lever,

a movable trigger lever for selectively triggering said switching means,

a detecting lever rotationally biased in a direction which is in accordance with a rotation and a rotational direction of a reel block, and

a cam gear rotated perpetually in one direction, said cam gear including a first cam surface guiding one end of said detecting lever when said detecting lever is rotationally biased in one direction, a second cam surface guiding one end of said detecting lever when said detecting lever is rotationally biased in the other direction, a detecting pawl protuberantly formed between and independently of said first cam surface and said second cam surface, and a center ring section responsive to the cessation of rotation of said reel block to guide one end of said detecting lever released from rotational biasing towards a rotational trajectory of said detecting pawl,

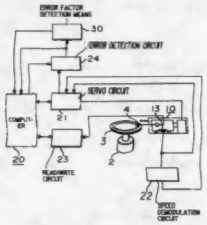
said detecting pawl thrusting said one end of said detecting lever so that the other end of said detecting lever actuates said trigger lever.

4,979,059

SYSTEM FOR STORING DATA IN A SEPARATE MEMORY WHEN THE NUMBER OF POSITIONING ERRORS OF A MAGNETIC DISC EXCEEDS A THRESHOLD

Masaharu Sengoku, Amagasaki, Japan, assignor to Misubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 169,877, Mar. 18, 1988, abandoned.
This application Nov. 27, 1989, Ser. No. 441,213
Claims priority, application Japan, May 13, 1987, 62-117414
Int. Cl.*[5] *G11B 5/55
U.S. Cl. 360—78.090 **4 Claims**



1. A data memorizing device which comprises:
a rotatable disk-like recording medium carrier,
a magnetic head placed near a recording surface of said recording medium carrier,
an actuator for supporting said magnetic head and adapted to cause a traverse movement on said recording surface so that said magnetic head is brought to a predetermined position on said recording surface,
a servo circuit for driving said actuator in accordance with an instruction signal from a computer,
an eror detection circuit which compares a position-determining time which is the time required for the movement of said magnetic head from beginning the movement of said head to the completion of the movement with a reference time which is previousl determined by said computer and outputs an error signal when the value of said position-determining the signal is greater than the value of said reference time, and
an error factor detection means which counts the number of said error signals provided by said error detection circuit said number of error signals being counted over a predetermined time period and/or a predetermined number of positioning operations, wherein said error factor detection means outputs a pulse signal when the value of a positioning-error factor, is greater than a predetermined value, said positioning-error factor being obtained by dividing said number of error signals by said predetermined time period and/or said predetermined number of positioning operations.

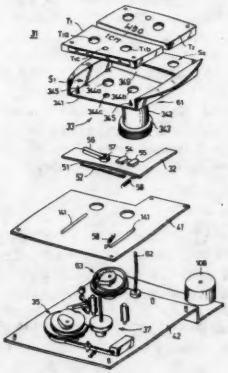
4,979,060

TAPE CHANGE MECHANISM FOR CASSETTE APPARATUS

Takashi Tanigawa, Sagamihara, Japan, assignor to Tandy Electronic Japan, Ltd., Tokyo, Japan

Filed Aug. 12, 1988, Ser. No. 231,769
Claims priority, application Japan, Apr. 6, 1987, 62-86787
Int. Cl.*[5] *G11B 15/68
U.S. Cl. 360—92 **38 Claims**

1. A tape cartridge apparatus for recording a signal on and reproducing a signal from a tape that is disposed in a selected one of a plurality of cassette tape cartridge means that are set therein, said tape cartridge apparatus comprising:
a frame;
a head base provided on said frame, said head base being slidable in a first plane between an operating position and a receded position, said head base comprising at least a recording and reproducing head for recording a signal on and reproducing a signal from a tape in a first predetermined cassette tape cartridge means that is disposed in a normal operating position;
a tape cartridge holder provided on said frame for holding said plurality of cassette tape cartridge means, said tape holder being rotatable and movable up and down with respect to said frame, said first predetermined cassette tape cartridge means being set in said normal operating position when said holder takes a first rotary position;
an elevator mechanism for raising and lowering said tape holder between a lowered position and a raised position in a cassette changing mode in which a selection of cassette tape cartridge means is made, said elevator mechanism raising and lowering said tape holder in a linear direction



and along a line substantially perpendicular to the first plane throughout the movement thereof;
a rotating mechanism for rotating said tape holder in the raised position a predetermined angle in the cassette changing mode;
and a moving mechanism for moving said head base between the operating position and the receded position,
said moving mechanism first moving said head base to the receded position in the cassette changing mode so that said tape holder in the raised position is rotated said predetermined angle to a second rotary position and then returning said head base to the operating position when said tape holder returns to the lowered position, thereby setting a cassette tape cartridge means other than said first predetermined cassette tape cartridge means in said normal operating position.

4,979,061

CASSETTE LOADING APPARATUS INCLUDING MEANS FOR CONTROLLING THE CASSETTE INSERTION FORCE

Yoshinobu Kishimoto, Takarazuka; Takashi Ando, Neyagawa, and Harumi Kudo, Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 7,108,593, Oct. 15, 1987, Pat. No. 4,866,551. This application Jul. 7, 1989, Ser. No. 376,671
Claims priority, application Japan, Oct. 17, 1986, 61-247811; Feb. 18, 1987, 62-35001
The portion of the term of this patent subsequent to Sep. 12, 2003, has been disclaimed.
Int. Cl.*[5] *G11B 15/60
U.S. Cl. 360—96.5 **4 Claims**

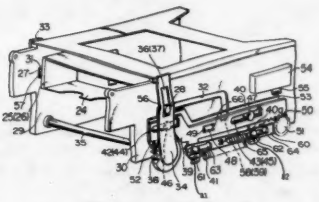
1. A cassette loading apparatus comprising:
a cassette holder for removably holding a cassette:

side plates each having a plurality of L-shaped guide grooves for guiding said cassette holder so that said cassette is reciprocated between a first position where said cassette can be loaded and unloaded, and a second position where said cassette is subjected to recording and reproduction, said guide grooves each including a substantially horizontal section and a substantially vertical section; and

a cassette holder drive means for driving said cassette holder so that said cassette holder is moved from said first position to said second position and vice versa, said cassette holder driving means further comprising:

sliding means, said sliding means being reciprocated substantially rectilinearly when driven by a motor coupled thereto, said sliding means including a clutch mechanism comprising:

a first sliding member movable in a substantially horizontal



direction along a guide member provided in at least one of said side plates, said first sliding member being formed thereon with a projection; and

a second sliding member having therein an elongated hole in which said projection formed on said first sliding member is engaged so as to be slidable therealong, said second sliding member being coupled with said first sliding member through the intermediary of a first resilient member so as to slide together with the first sliding member, said elongated hole having a length which is greater than the distance by which said projection moves corresponding to the distance by which said cassette holder moves at least along said substantially horizontal sections of said L-shaped guide grooves in said side plates; and

a drive power transmission mechanism for converting said substantially rectilinear motion of said sliding means into rotational motion so as to transmit a moving force to said cassette holder.

4,979,062

DISK DRIVE ARCHITECTURE

Frederick M. Stefansky, and Glade N. Bagnell, both of Longmont, Colo., assignors to Conner Peripherals, Inc., San Jose, Calif.

Continuation of Ser. No. 56,584, May 29, 1987, abandoned. This application Jan. 18, 1990, Ser. No. 464,696

Int. Cl.[5] G11B *5/012, 5/00*

U.S. Cl. 360—97.02 **5 Claims**

1. A disk drive, comprising:

a shock frame having mounting points;

control means for generating control signals; and

a hard disk drive assembly, mounted on said shock frame at said mounting points, comprising:

an end plate having a peripheral edge,

a gasket provided on said peripheral edge of said end plate,

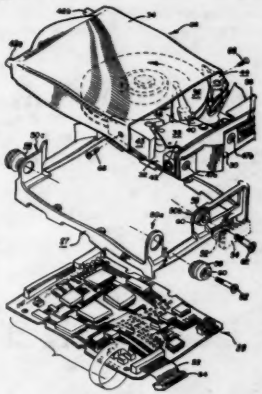
a casing having an opening, said casing being attached to said end plate so that said opening of said casing engages said gasket to provide a sealed environment within said casing,

a planar base plate having a first end mounted to said end plate so that said base plate is substantially perpendicular to said end plate and a second end mounted to said casing, said base plate residing in said sealed environment,

a top plate mounted on said base plate,

means, rotatably supported by said base plate, for storing information,

rotating means, responsive to said control signals, for rotating said disk means,



read and record means, responsive to said control signals, for reading information from said means for storing and recording information on said means for storing,

means for transferring said control signals from the control means to the environment within said casing, and

flexible circuit means for electrically interconnecting said means for transferring with said read and record means and said rotating means.

4,979,063

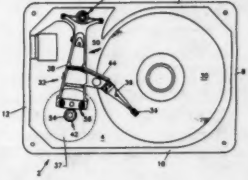
DESIGN FOR AN ACTUATOR ARM FOR A DISC DRIVE

Sanjoy Ghose, Santa Cruz; Ramgopal Battu, Los Angeles County, and Iraj Jabbari, Santa Clara County, all of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Continuation-in-part of Ser. No. 263,997, Oct. 25, 1988, abandoned, which is a continuation of Ser. No. 914,690, Oct. 2, 1986, abandoned. This application May 1, 1989, Ser. No. 345,434

Int. Cl.[5] G11B *5/55*

U.S. Cl. 360—106 **5 Claims**



1. In a disc drive comprising a base casting and upright sidewalls defining a data storage device housing, a constantly rotating disc supported on a spindle motor for constant rotation and having data stored in addressable locations on tracks thereon, and an actuator arm supporting a transducer for accessing said locations on the disc where data can be stored, said actuator arm including an elongated first arm portion extending from a pivot point adjacent one of the upright sidewalls to

contact a stepper motor supported from the base casting, and a second arm portion extending from the side of said first arm portion over said rotating disc, rotation of said stepper motor causing movement of said arm to position said transducer relative to said disc, said arm being supported at said pivot point by a bearing assembly mounted on said base casting and a strip spring partially arranged around said bearing assembly and fastened at its ends to said actuator arm to bias an end of said first arm portion distal from said bearing assembly in firm contact with said stepper motor so that rotation of said stepper motor will be accurately reflected in movement of said arm.

4,979,064

MAGNETIC RECORDING/PLAYBACK HEAD COMPRISING A SUPERCONDUCTING MATERIAL

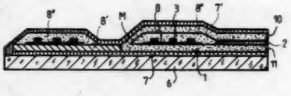
Jean-Claude Mage, Levallois Perret; Jean-Luc Rolland, Paris, and Jean-Paul Castera, Orsay, all of France, assignors to Thomson-CSF, Paris, France

Filed Oct. 26, 1988, Ser. No. 262,719

Claims priority, application France, Oct. 27, 1987, 87 14825

Int. Cl.[5] G11B *5/127*

U.S. Cl. 360—125 **5 Claims**



1. A recording/playback magnetic head comprising:
a magnetic circuit formed from two magnetic poles separated by a gap,
wherein the set of magnetic poles and the gap are arranged near a recording surface of a magnetic recording medium,
further wherein the gap contains at least one layer of superconducting material arranged in a direction substantially perpendicular to the recording surface of the recording medium; and
wherein said magnetic circuit comprises a magnetic field induction circuit formed as a thin film of the same superconducting material that is contained within said gap.

3. A magnetic recording/playback head comprising:
a magnetic driving circuit;
a single pole provided with a magnetic field induction coil and having a magnetic field emission end comprising an emission face placed near a recording surface of a magnetic recording medium so as to emit a magnetic field perpendicular to the recording surface, comprising at least one sheath made of a superconducting material covering the emission end except for the emission face; and
wherein said sheath of superconducting material covers the magnetic driving circuit mean and said magnetic field induction coil except for the emission face.

4,979,065

DISC CARTRIDGE HAVING A LINER AND AN ELASTIC MEMBER FOR MAINTAINING THE LINER IN CONTACT WITH A DISC

Masaru Ikebe; Haruo Shiba; Kimio Tanaka, and Kenkichi Akaoka, all of Nagano, Japan, assignors to TDK Corporation, Japan

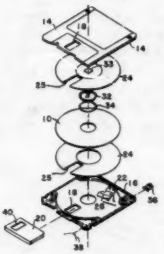
Filed Nov. 22, 1988, Ser. No. 274,761

Claims priority, application Japan, Nov. 26, 1987, 62-178823[U]

Int. Cl.[5] G11B *23/03*

U.S. Cl. 360—133 **9 Claims**

1. A disc cartridge comprising:
a casing having a space defined therein;
a disc rotatably received in said space of said casing;
at least one sheet-like liner arranged in said casing in a manner to be contactable with a surface of said disc; and
at least one elastic member arranged in said casing for forcibly contacting said liner with said disc;
said elastic member having one end affixed an inner surface of said casing and the other end acting as a free end;
said elastic member being formed with a projecting portion by means of which said elastic member forcibly contacts



said liner with said disc and wherein said projecting portion contacts said liner at a single position between said one end and said free end and wherein said elastic member is so formed that the distance between said free end and said projecting portion is substantially smaller than the distance between the part of said projecting portion in contact with said liner and said one end.

4,979,066

LOADING CONTROLLING APPARATUS

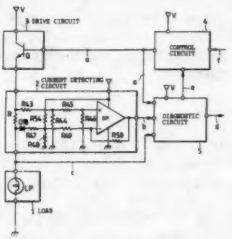
Toshihiko Kawata, Furukawa; Ken Mizuta, Miyagi, and Kazuaki Fukuda, Furukawa, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 282,416, Dec. 9, 1988, abandoned. This application Jun. 12, 1990, Ser. No. 537,210

Claims priority, application Japan, Mar. 4, 1988, 63-52311

Int. Cl.[5] H02H *7/20*

U.S. Cl. 361—10 **3 Claims**



1. A load controlling apparatus for regulating power flow from a power source (V) to a load (1) having a power input, comprising:
drive means (3) for controlling supply of power to the load (1);
control means (4) for supplying a control signal (a) to the drive means (3);
current detecting means (2) for detecting level of current flow to load (1) and for supplying a current status signal (b) corresponding to the strength of current detected;
voltage detecting means for providing a voltage status signal (c) corresponding to the voltage of said power input to the load; and
judging means (5) for judging any extraordinary condition present in the drive means or the load, based upon the

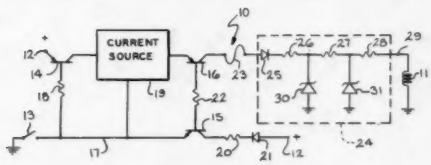
control signal (a), and status signals (b) and (c), and thereafter supplying a feedback control signal (e) to the control means (4), and one or more output status signals representing the extraordinary condition judged.

4,979,067

VOLTAGE AND CURRENT LIMITING POWER SUPPLY

Raymond J. Foley, Toledo, Ohio, assignor to Illinois Tool Works, Inc., Glenview, Ill.

Filed Jun. 20, 1989, Ser. No. 369,024
Int. Cl.[5] H02H 3/20
U.S. Cl. 361—18 **6 Claims**



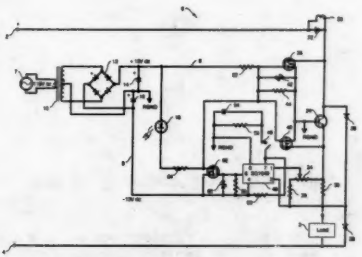
1. A circuit for supplying power to a normal load at a predetermined current and a predetermined voltage comprising a dc power source having a maximum voltage greater then said predetermined voltage, dc current source means operated from said power source for establishing a constant current output for operating the normal load at said predetermined current and voltage, said current source means output having a maximum voltage no greater then said maximum power source voltage, a resistor and a voltage limiter connected in series across said current source means output, said voltage limiter having a breakdown voltage above said predetermined voltage at the normal load when the load is drawing said predetermined current, and means connecting said load in parallel with said voltage limiter, said voltage limiter limiting the voltage at said load to said breakdown voltage, and wherein the maximum current available from said circuit at a short circuited load is said predetermined current and the maximum voltage available at an open circuited load is the lesser of said breakdown voltage and said maximum current source means output voltage.

4,979,068

HIGH SPEED ELECTRONIC CIRCUIT BREAKER

Seyd M. Sobhani, 1902 Duvall Ave., NE., Renton, Wash. 98056, and Anthony O. Thomas, 3303 E. Denny Way, Seattle, Wash. 98122

Filed Feb. 7, 1989, Ser. No. 306,914
Int. Cl.[5] H02H 3/20
U.S. Cl. 361—18 **1 Claim**



1. A circuit breaker for controlling current flow between first and second terminals connected to a power supply, comprising:

a switching transistor, having a base, a collector. and an emitter, and permitting current flow between the first and second terminals when on and interrupting current flow between the first and second terminals when off;

a first field-effect transistor having a gate, a source connected to the base of the switching transistor, and a drain connected to the collector of the switching transistor;

a second field-effect transistor having a gate, a source connected to the base of the switching transistor, and a drain connected to the emitter of the switching transistor; and

a control means connected to the gates of the first and second field-effect transistors for producing a first control signal which turns the second field-effect transistor off and the first field-effect transistor on to turn the switching transistor on when the magnitude of the current flowing between the first and second terminals is less than a predetermined limit and a second control signal which turns the first field-effect transistor off and the second field-effect transistor on to turn the switching transistor off when the magnitude of the current reaches the predetermined limit, the control means further comprising:

a current sensing means for producing a voltage signal related to the magnitude of the current flowing between the first and second terminals;

a latch means responsive to the voltage signal for producing an output signal which ha a first value when the voltage signal is less than a threshold level and which latches to a second value when the voltage signal reaches the threshold level;

a power supply having positive and negative supply lines; and

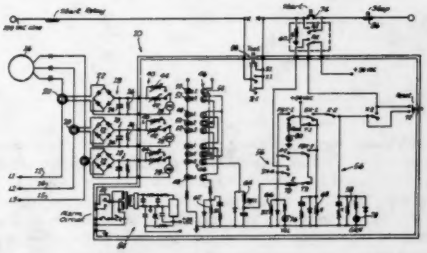
a third field effect transistor having a gate connected to the latch means to receive the output signal, a source connected to the negative supply line, and a drain connected to the gates of the first and second field-effect transistors and to the positive supply line, the third field effect transistor turning off in response to the output signal of the first value to cause the first control signal to be applied to the gates of the first and second field-effect transistors and turning on in response to the output signal of the second value to cause the second control signal to be applied to the gates of the first and second field-effect transistors.

4,979,069

MOTOR FAULT DETECTOR WITH OPTICAL ISOLATION

Elmer Simpson, Plymouth, Mass., assignor to Elmer Simpson & Edgar Powell, Fort Worth, Tex.

Filed Jan. 8, 1987, Ser. No. 25,095
Int. Cl.[5] H02H 3/10
U.S. Cl. 361—31 **17 Claims**



1. An improved motor protection apparatus, comprising:

current monitoring means, said current monitoring means for sensing the presence of current in one phase of said motor;

ammeter means, responsive to said monitoring means, for indicating the level of current present in said phase, said

ammeter means including indicator means that move in response to varying levels of current present in said phase, said indicator means being opaque;

variable resistor means interposed said monitoring means and said ammeter means, allowing said ammeter means to selectively indicate start current and run current in said phase;

optical isolator means, responsive to said ammeter means, for indicating readings of said ammeter means at predetermined values comprising one or more pairs of a light-emitting diode optically coupled to a phototransistor, each pair having a space between said light-emitting diode and said phototransistor adapted to allow at least one of said indicator means to move through said space in response to varying levels of current present in said phase, said indicator means blocking the light emitted from said light-emitting diode from reaching said phototransistor when said indicator means is between said light-emitting diode and said phototransistor, thereby de-energizing said pair of said optical isolator means having said indicator means between said light-emitting diode and said phototransistor; and

relay means, responsive to said optical isolator means, for controlling the presence or absence of input voltage to said motor;

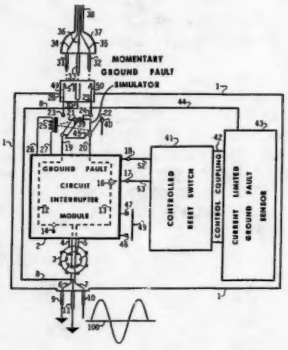
said motor protection apparatus sensing fault conditions in both the start mode and run mode of said motor and initiating appropriate responses thereto, whereby said motor is protected from permanent damage by the early detection of said faults.

4,979,070

AUTOMATIC RESET CIRCUIT FOR GFCI

Lawrence E. Bodkin, 1149 Molokai Rd., Jacksonville, Fla. 32216

Filed Jun. 13, 1989, Ser. No. 365,520
Int. Cl.[5] H02H *3/16*
U.S. Cl. 361—42 **23 Claims**



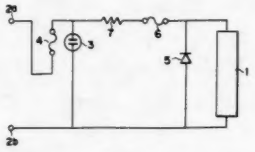
15. In a ground fault circuit interrupter having a ground fault sensor means including a differential current transformer and having a load current switching means responsive to said sensor means to supply a load current from an alternating current source to a load current utilization device, the improvement comprising an other sensor means to determine ground fault conditions after interruption of said load current by said switching means in response to said sensor means, circuit means responding to said other sensor means for automatically resetting said interrupter whenever said other sensor means determines an absence of ground fault in the circuitry of said load current utilization device or determines that conductivity of a ground fault in said circuitry does not exceed a predetermined level generally recognized as non-hazardous.

4,979,071

PROTECTION CIRCUIT FOR A SEMICONDUCTOR CIRCUIT

Takaaki Ito; Akio Uchida, and Hiroyuki Ikeda, all of Yokosu, Japan, assignors to Mitsubishi Mining and Cement Co. Ltd., Tokyo, Japan

Filed Sep. 13, 1988, Ser. No. 243,705
Claims priority, application Japan, Sep. 16, 1987, 62-229650
Int. Cl.[5] H02H *3/24*
U.S. Cl. 361—56 **10 Claims**



1. A protection circuit for a semiconductor circuit, comprising

an electrical source connected to the semiconductor circuit for supplying current to the semiconductor circuit;

a gas discharge tube surge absorbing device arranged in parallel with the semiconductor circuit for absorbing a surge from said electrical source to the semiconductor circuit;

a Zener diode arranged in parallel between said surge absorbing device and the semiconductor circuit;

a first fuse connected in series with the semiconductor circuit at a position between said electrical source and said surge absorbing means; and

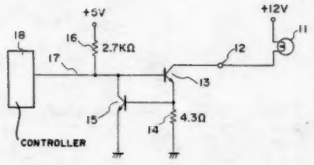
a second fuse and resistor connected in series with the semiconductor circuit at a position between said surge absorbing means and said Zener diode, said first and second fuses breaking down at differing applied amperages.

4,979,072

LAMP OUTPUT PROTECTIVE CIRCUIT IN ELECTRONIC CONTROLLER

Yasunobu Ito; Kunihiro Yamada, and Akihiko Kubota, all of Aichi, Japan, assignors to Aisin AW Kabushiki Kaisha, Japan

Filed Nov. 14, 1988, Ser. No. 270,034
Claims priority, application Japan, Dec. 28, 1987, 62-329506
Int. Cl.[5] H02H *3/08*
U.S. Cl. 361—87 **2 Claims**



1. A vehicle display lamp output circuit including a transistor protective circuit, comprising:

(a) a first electric power source;

(b) a lamp for display in a vehicle having an input terminal connected to said first electric power source;

(c) a first npn transistor having its collector connected to an output terminal through which said lamp is supplied with electric power;

(d) a low resistor connected between an emitter of said first npn transistor and the ground;

(e) a second npn transistor having its collector connected to

a base of said first non transistor, its emitter to the ground and its base to a point between said emitter of said first non transistor and said low resistor;

(f) an electric controller connected to the collector of said second npn transistor;

(g) a second electric power source connected to the collector of said second npn transistor; and

(h) said second npn transistor and said resistor providing a current limiting circuit for protecting said first npn transistor against excess current; and wherein

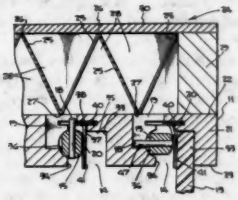
(i) said second npn transistor is turned on when excess current flows through said resistor to turn off said first npn transistor, and said second npn transistor is automatically turned off when the current flow in said resistor is reduced to allow said first non transistor to turn on.

4,979,073

LOW FRICTION INSERTION STRUCTURE AND METHOD OF MAKING

Martin D. Husted, Van Nuys, Calif., assignor to International Electrical Research Corp., Burbank, Calif.

Filed Apr. 29, 1988, Ser. No. 188,222
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—386 **13 Claims**



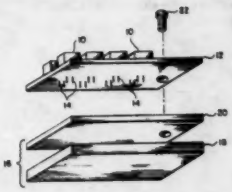
1. A heat dissipating container for retention of sheets of material of the nature of electronic circuit boards comprising oppositely disposed cold walls of substantially homogeneous heat conducting material throughout the mass of said cold walls, each cold wall comprising a heat conducting panel having an outside face and an inside face, a plurality of spaced parallel slots on the inside face of each panel for reception of opposite edge portions of said boards, each of said slots having a substantially rectangular shape with opposite side walls, a bottom wall and an open side opposite said bottom wall, one of said side walls having a semicylindrical pocket extending throughout the length of a corresponding slot, the panel of said corresponding slot having a substantially T-shaped groove adjacent the bottom wall of said corresponding slot with a shaft portion of the T-shaped groove in communication with said corresponding slot, a crossbar portion of the T-shaped groove being located in the material of said panel between said bottom wall of said corresponding slot and said outside face of the panel, a substantially T-shaped spring member having a crossbar portion lodged in the crossbar portion of the groove and part of a shaft portion of the spring member being lodged in the shaft portion of the T-shaped groove and extending inwardly into the slot, there being a rod member rotatably mounted in each slot, said rod member having a retention position in the pocket and extending against the spring member for retention of the board, said rod member having a rotationally removed release position for said board, there being a plurality of laterally spaced heat dissipating fins extending throughout the area of the outside face of each of said cold walls.

4,979,074

PRINTED CIRCUIT BOARD HEAT SINK

Richard E. Morley, and David A. Baker, both of Mason, N.H., assignors to Flavors Technology, Amherst, N.H.

Filed Jun. 12, 1989, Ser. No. 364,892
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—386 **8 Claims**



6. For use in a circuit board having one or more heat-generating electronic components mounted on one surface thereof, the components having pins which attach the one or more heat-generating electronic components to the circuit board and which protrude a short predetermined distance from the back surface of the circuit board, a heat sink for the circuit board, comprising:

a thermally-conductive, electrically-insulative elastomer disposed on the back surface of the circuit board and having a predetermined thickness greater than the short predetermined distance that the pins protrude from the back surface of the circuit board wherein the protruding portion of the pins of at least one electronic component are embedded totally within said elastomer to provide a thermally-conductive path from the one or more heat-generating components to said elastomer for cooling the one or more heat-generating components;

a thermally-conductive plate disposed on the elastomer; and

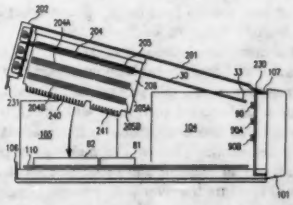
means for securing the circuit board, said elastomer and said thermally-conductive plate together.

4,979,075

METHOD AND APPARATUS FOR CONTROLLING CIRCUIT EXPANSION FOR CONSUMER ELECTRONIC SYSTEMS

Preston J. Murphy, Austin, Tex., assignor to Compuadd, Corporation, Austin, Tex.

Filed Oct. 12, 1989, Ser. No. 420,169
Int. Cl.[5] H05K 1/14
U.S. Cl. 361—399 **16 Claims**



1. In an electronic housing having a main circuit board, the method of adding add-on boards to the main circuit board when the main circuit board has established thereon an electrical connector, said method comprising the steps of:

plugging into said board connector a connector support board, said support board being positioned perpendicular to the main circuit board, said support board having a plurality of connectors thereon;

supporting a rearward edge of said support board by a rearward support bracket connectable with a back edge of

said housing, said bracket having a front extending support extending for support to a front edge of said housing;

inserting into said housing one or more of said add-on boards, in a plane parallel with the plane of the main circuit board; and

positioning an electrical connector edge of each of said inserted add-on boards into a respective one of said electrical connectors of said support board.

4,979,076

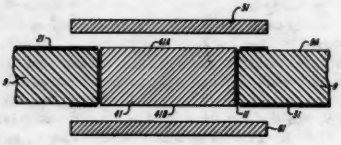
HYBRID INTEGRATED CIRCUIT APPARATUS

Raymond DiBugnara, 18 Meadow Rd., Bolton, Mass. 01740

Filed Jun. 30, 1989, Ser. No. 375,033

Int. Cl.[5] H05K *1/18*

U.S. Cl. 361—401 **10 Claims**



1. A hybrid integrated circuit apparatus comprising:

a circuit board having a first surface and a second surface and defining at least one aperture extending from said first surface to said second surface of said board,

said circuit board having a first circuit element bonded on said first surface,

said first circuit element defining a first circuit portion adjacent said aperture,

said circuit board having a second circuit element bonded on said second surface,

said second circuit element defining a second circuit portion adjacent said aperture,

said circuit board having a predetermined length from said first surface to said second surface;

an electrical component having a first lead at a first end thereof and a second lead at a second end thereof, said first lead and said second lead being spaced apart a distance approximately equal to said predetermined length, said electrical component disposed in said aperture so that said first lead of said component is about at said first surface of said circuit board and said second lead of said component is about at said second surface of said circuit board;

a first preformed disk comprising fusible material having a melting temperature below the melting temperature of said first circuit element and being sized to fully extend over said aperture to cover said first end of said electrical component and contact said first circuit portion, said first disk having been melted and reformed in place with said first disk having a surface in electrical contact with said first end of said electrical component in said circuit board and being fused to said first circuit portion thereby forming a hermetic seal; and

an electrically conductive member fused to said second end of said electrical component in said circuit board and further fused to said second circuit element thereby forming a hermetic seal enclosing said second end of said electrical component in said circuit board.

4,979,077

BOWL-SHAPED REFLECTOR FOR A VEHICLE HEADLIGHT

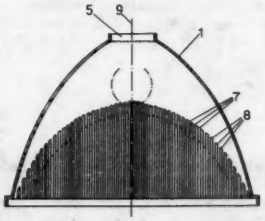
Wolfgang Philipp-Buterowe, Hamm, and Franz-Josef Kalze, Harsewinkel, both of Fed. Rep. of Germany, assignors to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany

Filed Oct. 25, 1989, Ser. No. 426,442

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1988, 3836382

Int. Cl.[5] B60Q *1/04*

U.S. Cl. 362—61 **14 Claims**



1. In a bowl-shaped reflector for a vehicle headlight produced by a casting process having at least one flattened section whose interior side is provided with a surface on which light rays given off by a filament of a light bulb mounted in the reflector fall and are reflected in a scattered manner, the improvement wherein:

the interior side of the flattened section has grooves therein defined by reflecting surfaces, said grooves being elongated substantially in a direction of an optical axis of the bowl-shaped reflector, being at least as deep as they are wide, and being defined by side surfaces which extend approximately parallel to one another, such that at least a portion of light rays falling in the grooves from the filament is reflected a plurality of times on wall surfaces forming the grooves.

4,979,078

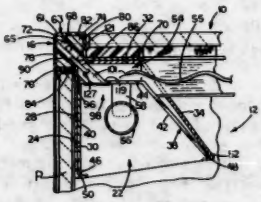
LIGHTED DISPLAY CASE

Douglas D. Amstutz, Muskegon, and Ronald A. Vanderboegh, Twin Lakes, both of Mich., assignors to Amstore Corporation, Muskegon, Mich.

Filed Jul. 17, 1989, Ser. No. 381,117

Int. Cl.[5] A47F *11/10*

U.S. Cl. 362—125 **7 Claims**



1. A display case comprising:

a framework;

a plurality of panels supported by said framework and defining therewith an enclosure;

a lighting system including a light fixture, said light fixture including at least one transverse opening extending therethrough; and

a mounting assembly including means for releasably fasten-

ing said light fixture to said framework within said enclosure and further including a tubular member received within said light fixture opening to receive and guide said fastening means in securing said light fixture to said framework, said fastening means being accessed for insertion and removal from within said enclosure.

4,979,079

SUN VISOR FOR AUTOMOTIVE VEHICLE

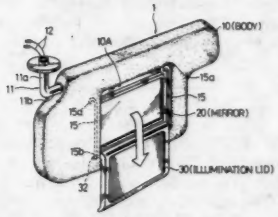
Makoto Tawaraya, Isehara, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 1, 1989, Ser. No. 430,178

Claims priority, application Japan, Nov. 9, 1988, 63-146517[U]

Int. Cl.[5] F21V *33/00*

U.S. Cl. 362—135 **4 Claims**



1. A sun visor for an automotive vehicle comprising:

(a) a sun visor body formed with a recessed portion;

(b) a vanity mirror unit attached to a bottom surface of the recessed portion; and

(c) an illumination lid unit provided with an illumination means and slidably fitted to the recessed portion formed in said sun visor body so as to be flush with a surface of said sun visor body, said illumination lid unit being slidably movable away from the recessed portion along the surface of said sun visor body to expose said vanity mirror unit and to activate said illumination lid unit for illumination.

4,979,080

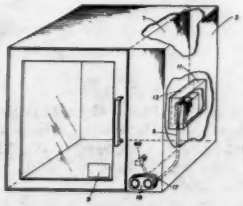
FLASHING LIGHT APPARATUS DESIGNED FOR NEWSPAPER VENDING MACHINES

Ruth H. Sanders, P.O. Box 1073, Novato, Calif. 94945

Filed Aug. 18, 1989, Ser. No. 395,885

Int. Cl.[5] F21V *33/00*

U.S. Cl. 362—154 **5 Claims**



1. A flashing light for a newspaper vending machine comprising:

a flashing light enclosed within a colored, plastic light housing attached to an inner wall of said newpaper vending machine;

a circuit board, containing a timer for activating said flashing light for a predetermined time period, electrically connected to said flashing light;

a battery, contained in a battery housing, electrically connected to said circuit board for providing power to said flashing light, and;

a push button switch for activating said timer, thereby activating the flashing light so as to alert prospective buyers to the presence of newspapers in the newspaper vending machine.

4,979,081

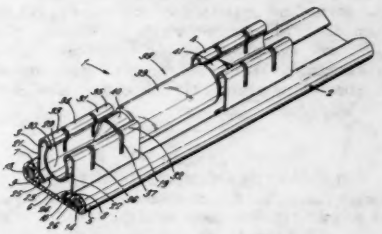
ELECTRICAL SUPPLY SYSTEM

Dennis Leach, Hertfordshire, and Clive Dinmore, Chelmsford, both of United Kingdom, assignors to Courtney Pope Lighting Limited, London, United Kingdom

Filed Dec. 7, 1989, Ser. No. 446,550

Int. Cl.[5] H01R *33/00*

U.S. Cl. 362—219 **10 Claims**



1. An electrical supply system comprising a track having an elongate insulating member defining first and second channels and first and second electrical conductors housed in the first and second channels respectively so as to extend longitudinally of the track in spaced apart relationship, the supply system further comprising a plurality of like connectors each having attachment means operable to attach the connector to the track at a continuously adjustable position along its length and contact means making electrical contact with the track when so attached, and wherein each connector comprises a sheet of resilient metallic material having longitudinally extending first and second edge portions, the sheet being shaped by bending such that the edge portions are insertable into the channels and having a shape memory such that when inserted the edge portions are resiliently biased into the channels to thereby constitute the attachment means, the channels being partially occupied by the first and second conductors respectively and the edge portions being of unequal lateral extent such that only the first edge portion makes contact with one of the first and second conductors to thereby constitute the contact means, whereby each connector is selectively attachable in either a first or second orientation relative to the track such that the contact means makes electrical contact with only the first or second conductor respectively.

4,979,082

RELIEVED PLASTIC LAMP BASE

Daniel D. Devir, Sutton, N.H., assignor to GTE Products Corporation, Danvers, Mass.

Filed Jun. 2, 1989, Ser. No. 360,679

Int. Cl.[5] H01R *33/00*

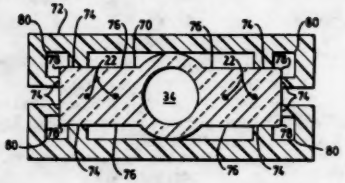
U.S. Cl. 362—226 **7 Claims**

1. A relieved, lamp base for receiving a press seal of an electric lamp, the press seal formed by exterior walls and having at least a first lamp wall, and an adjacent second lamp wall forming an intermediate lamp corner region extending in a direction substantially parallel with the first lamp wall and the second lamp wall, the relieved lamp base comprising:

(a) a plastic lamp base having internal walls defining a formed cavity to receive the press seal,

(b) a first internal base wall to couple with a portion of the first lamp wall,

(c) a second internal base wall to couple with a portion of the second lamp wall,



(d) an internal relieved wall formed intermediate the first interior wall and second interior wall extending in a direction substantially parallel with the first interior wall and the second interior wall defining a relief cavity opposite the lamp corner region when the press seal is positioned in the base cavity whereby the relieved wall is offset from the lamp corner region.

4,979,083

LAMP WITH AN INTEGRAL SWITCH

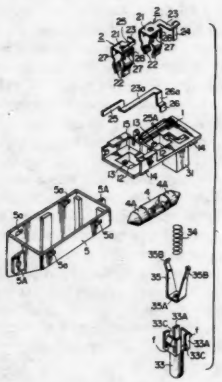
Tsunesuke Takano, and Kouichi Shinzawa, both of Tokyo, Japan, assignors to Daiichi Denso Buhin Co., Ltd., Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 396,896

Claims priority, application Japan, Aug. 24, 1988, 63-110922[U]; Aug. 29, 1988, 63-113168[U]; Dec. 7, 1988, 63-159072[U]; Dec. 7, 1988, 63-159073[U]

Int. Cl.[5] F21V *23/04*

U.S. Cl. 362—394 **7 Claims**



1. A lamp assembly with an integral switch, said lamp assembly comprising:

(a) an electrically insulating base plate;

(b) a pair of bulb sockets each of which consists of a conductive plate formed into a U-shaped configuration so as to establish a pair of squeezing pieces;

(c) an elongate bulb operatively held by means of said bulb sockets;

(d) said squeezing pieces defining mounting bores;

(e) connecting pieces extending from said conductive plates;

(f) said insulting base plate having projecting socket-insertion sections for mounting said bulb sockets to said insulating base plate, and having protrusions which are engaged with a respective one of said mounting bores;

(g) a tubular member formed integrally with said insulating base plate on one side thereof and having a pair of opposing fixed electrical contact pieces, said fixed contact pieces extending from respective ones of said connecting pieces and into said tubular member;

(h) a push switch mounted within said tubular member, said push switch having (1) a switch knob received within said tubular member and capable of reciprocal movements therewithin between extended and retracted positions, (2) a movable contact piece and (3) a spring, the movable contact piece being slidably brought into contact with said pair of fixed contact pieces when said switch knob is in said extended position so as to make an electrical circuit between said bulb sockets and a source of electrical power, whereby said bulb is illuminated, and being separated from at least one of said fixed contact pieces when said switch knob is in said retracted position so as to break the electrical circuit between said bulb sockets and the source of electrical power, whereby said bulb is extinguished.

4,979,084

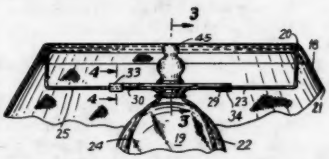
FINIAL SUPPORT FOR TABLE LAMP

Martin Krauthamer, 65 Beverly Rd., Great Neck, N.Y. 11021

Continuation-in-part of Ser. No. 318,920, Mar. 3, 1989, abandoned. This application Oct. 6, 1989, Ser. No. 418,160

Int. Cl.[5] F21V *17/00*

U.S. Cl. 362—457 **6 Claims**



1. A device for providing a finial on a table lamp having a metal hoop-type lampshade which is releasably secured to said lamp by a pair of opposed spring clips which grip a lightbulb held in said lamp, said spring clips being connected to said hoop of said lampshade by spokes, comprising:

(a) a plate member;

(b) wire securing means extending from said plate member for releasably securing said plate member to said spokes said wire securing means comprising a pair of opposed tabs which selectively grip and release said spoke wires; and

(c) said plate member having finial holding means for a finial.

4,979,085

LIGHT DISPLAY APPARATUS

Austin B. Voorhees, 104 Wellington St., Hickman, Ky. 42050

Filed Mar. 26, 1990, Ser. No. 498,683

Int. Cl.[5] F21P *1/00*

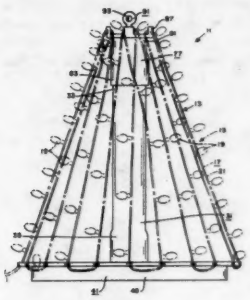
U.S. Cl. 362—252 **15 Claims**

1. An apparatus for displaying an elongated, flexible strand of lights, said apparatus comprising, in combination:

(a) an elongated body means having a first end and a second end; and

(b) base means for being mounted on said second end of said body means; said base means including a center member, an outer member, and joining means extending between said center member and said outer member for fixedly

joining said center member to said outer member, said outer member of said base means including a ring member



for allowing said strand of lights to be looped between said first end of said body means and said ring member.

4,979,086

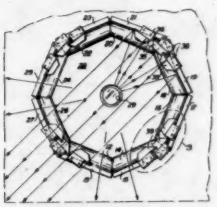
LUMINAIRE HAVING MAIN AND SECONDARY REFLECTOR SECTIONS

Richard V. Heinisch, Scottsdale, Ariz., assignor to Lowering Systems, Inc., Chicago, Ill.

Filed Apr. 12, 1990, Ser. No. 507,857

Int. Cl.[5] F21V *7/00*

U.S. Cl. 362—297 **15 Claims**



1. A luminaire for producing substantially uniform rectangular patterns of light including, in combination:

a housing having an open side for permitting light to pass outwardly therefrom;

a plurality of curved main reflector sections, extending a pre-determined distance into said housing from said open side with adjacent main reflector sections joined together at the edges thereof, and located concentrically about a bulb mounting location opposite the open side of said housing for reflecting light from a bulb at such location through such open side; and

a first, flat secondary reflector section having a length less than said pre-determined distance overlying the joined edges of at least two adjacent main reflector sections and mounted in a plane substantially perpendicular to the plane passing through the joined edges of such two adjacent main reflector sections and the center of the bulb mounting location to modify the pattern of light reflected from the open side of said housing.

4,979,087

INDUCTIVE COUPLER

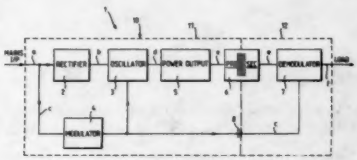
Raymund E. Sellwood, and Peter T. Hartfield, both of Reading, Great Britain, assignors to Aviation Limited, Berkshire, England

Filed Aug. 31, 1989, Ser. No. 401,320

Claims priority, application United Kingdom, Sep. 9, 1988, 8821130

Int. Cl.[5] H02M *5/40*

U.S. Cl. 363—34 **9 Claims**



1. An inductive coupler comprising:

a rectifier having an input and an output, said rectifier comprising a means for rectifying an alternating current power supply applied to said input to produce a rectified power supply at said output;

a high frequency oscillator, said high frequency oscillator having a power input and a high frequency signal output, said power input of said high frequency oscillator being operatively connected to an driven by, said output of said rectifier;

a modulator, said modulator having an input and an output, said input of said modulator being operatively connected to said high frequency signal output of said high frequency oscillator, said modulator comprising a means for modulating said high frequency signal output from said high frequency oscillator with a lower frequency alternating signal;

a split transformer means, said split transformer means having a primary and secondary section, said primary and secondary sections of said split transformer means comprising a means for rendering said sections physically separable, said output of said modulator being coupled to said primary section of said split transformer means;

a demodulator, said demodulator having an input and an output, said input of said demodulator being operatively coupled to said secondary section of said split transformer means, said demodulator comprising a means for demodulating a high frequency signal applied to said demodulator input from said secondary section of said split transformer means and for producing at said demodulator output a low frequency alternating current power output; and,

an auxiliary connector, said auxiliary connector having a first part operatively connected to a reference from said lower frequency alternating modulation signal imposed by said modulator and a second part operatively connected to said demodulator, said reference connected via said auxiliary connector comprising a means for ensuring that said demodulator maintains synchronism with said modulator in use of said inductive coupler.

4,979,088

INTEGRATED HIGH VOLTAGE GENERATING SYSTEM

Hirozumi Misaki, Suita, and Yasuyuki Okada, Takatsuki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 26, 1989, Ser. No. 457,167

Int. Cl.[5] H02M *3/155, 3/018*

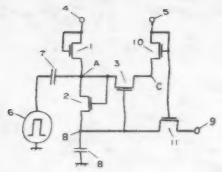
U.S. Cl. 363—060 **5 Claims**

1. An integrated high voltage generating system comprising:

a charge pump for boosting stepwise the potential of an output node sequentially from the value of a first supply

voltage to the value of a second supply voltage in synchronism with clock pulses applied through a capacitor;

an output MOS transistor connected between said output node and an output terminal; and



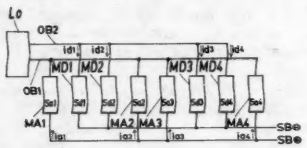
gate voltage supply means for supplying said second supply voltage to the gate electrode of said output MOS transistor.

4,979,089

METHOD FOR BALANCING CURRENTS TO SWITCHING DEVICES

Shinichi Takase, Ebina, and Masayuki Ishii, Yokohama, both of Japan, assignors to Neturen Company Limited, Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,272
Int. Cl.[5] H02M 7/5387; H02H 7/122
U.S. Cl. 363—132 4 Claims



1. A method for balancing a current distribution to a plurality of switching devices of a full-bridge inverter composed of N modules, N being an even positive number, each of the N modules including series connected first and second switching devices and first and second terminals respectively connected to the first and second switching devices, said method comprising the steps of:

arranging the N modules in a row extending from a first end to a second end;

providing first and second supply feeder bars along one side of the row of N modules, the first supply feeder bar for connecting to a first terminal of a dc power source, and the second supply feeder bar for connecting to a second terminal of the dc power source;

providing first and second load feeder bars along an opposite side of the row of N modules relative the first and second supply feeder bars, the first load feeder bar for connecting to a first terminal of a load, and the second load feeder bar for connecting to a second terminal of the load;

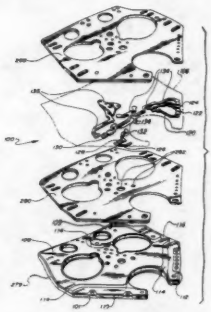
connecting the first terminal of each of the N modules to one of the first and second load feeder bars, and connecting the second terminal of each of the N modules to one of the first and second supply feeder bars, such that a current flow direction for each of the N modules, other than the modules arranged at the first and second ends of the row, is the same as a current flow direction of one adjacent module and is opposite a current flow direction of the other adjacent module.

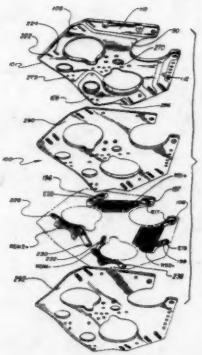
4,979,090

POWER CONVERTER CIRCUIT BOARD

John Huss; Richard J. Hoppe, both of Rockford; Lawrence E. Crowe, Lindenwood; Thomas Sutrina, and Eric D. Lakin, both of Rockford, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 11, 1989, Ser. No. 448,314
Int. Cl.[5] H02M 1/00
U.S. Cl. 363—141 14 Claims





1. A circuit board, comprising:

a substrate having a main layer including an electrically conductive portion and an electrically nonconductive portion adjacent the electrically conductive portion, the substrate having first and second opposite faces wherein the electrically conductive and nonconductive portions extend substantially an entire distance from the first face to the second face and further including a layer of insulating material disposed on a first side of the electrically conductive portion and an electrically conductive component in contact with the layer of insulating material; and

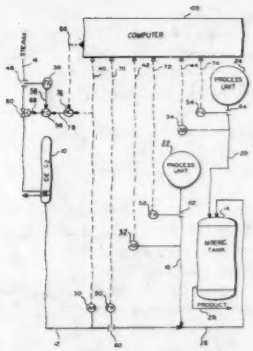
means extending through the layer of insulating material for coupling the electrically conductive component to the electrically conductive portion of the substrate.

4,979,091

CONTROL OF A BLENDING SYSTEM

Lloyd R. Albers, Angleton, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 27, 1986, Ser. No. 923,254
Int. Cl.[5] G06F 15/46
U.S. Cl. 364—148 3 Claims



1. A method of continuously blending a plurality of fluid streams to obtain a blended product having a predetermined desired concentration of a selected material, wherein each of said plurality of fluid streams is a unit blending stream comprising a major portion of a selected material and a minor portion of an impurity material, and wherein a first unit blending stream is provided from a first process operating unit to a mixing tank located at a distance from said first process operating unit, and wherein said first process operating unit can be controlled to vary the concentration of said impurity material and the concentration of said selected material in said first unit blending stream and further wherein a second process unit, located at a distance from said mixing tank provides a second unit blending stream to said mixing tank, said method comprising the steps of:

establishing a first signal representative of the concentration of said impurity material in said first unit blending stream wherein said first signal is obtained at said first process unit;

establishing a second signal representative of the concentration of said impurity material in said second unit blending stream wherein said second signal is obtained at said second process unit;

establishing a third signal representative of the desired concentration of said selected material in said blended product;

establishing a fourth signal representative of the actual flow rate of said first unit blending stream;

establishing a fifth signal representative of the actual flow rate of said second unit blending stream,

establishing a sixth signal representative of the desired concentration of said impurity material in said first unit stream in response to said first through fifth signals, wherein said step of establishing said sixth signal comprises:

summing said fourth and said fifth signal to establish a seventh signal which is representative of the actual total flow rate to said mixing tank;

multiplying said fourth signal by said first signal to establish an eighth signal which is representative of the volume flow rate of said impurity material flowing in said first unit blending stream;

multiplying said fifth signal by said second signal to establish a ninth signal which is representative of the volume flow rate of said impurity material flowing in said second unit blending stream;

summing said eighth signal and said ninth signal to establish a tenth signal which is representative of the actual total volume flow rate of said impurity material flowing to said mixing tank;

establishing an eleventh signal responsive to said third signal which is representative of the maximum concentration of said impurity material in said blended product which will satisfy the purity specification for said selected material in said blended product;

multiplying said eleventh signal by said seventh signal to establish a twelve signal representative of the maximum actual volume flow rate of said impurity material flowing into said mixing tank, wherein the maximum impurity material in the mixing tank corresponds to the minimum selected material that will satisfy said predetermined desired concentration of selected material;

subtracting said tenth signal from said twelfth signal to establish a thirteenth signal which is representative of the volume flow rate of said impurity material that can be summed with the actual flow rate of said impurity flowing to said mixing tank to maintain the actual concentration of said selected material substantially equal to said desired concentration of said selected material represented by said third signal;

dividing said thirteenth signal by said fourth signal to establish a fourteenth signal which is representative of the maximum fractional flow that said fourth signal can be changed while maintaining the actual concentration of said selected material substantially equal to said desired concentration of said selected material represented by said third signal, and

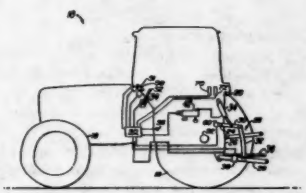
establishing said sixth signal in response to said fourteenth signal.

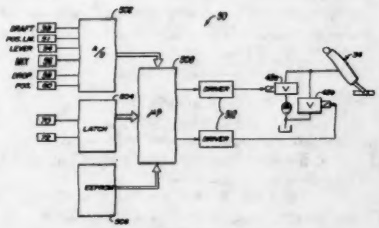
4,979,092

HITCH CONTROL SYSTEM

Mark A. Bergene, and Thomas E. Boe, both of Cedar Falls, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 6, 1989, Ser. No. 294,522
Int. Cl.[5] G05B 13/04; A01B 63/112
U.S. Cl. 364—148 14 Claims





5. In a vehicle having a hitch for attaching a ground-penetrating implement thereto and actuating means for raising and

lowering the hitch through a range of positions in response to control signals applied to an input thereof, a control system comprising:

a sensor for generating a feedback signal (FDBK) representing a sensed position of the hitch;

means for generating a reference signal (R) representing a reference position of the hitch;

means for generating an error signal representing a non-linear function of a difference between the feedback and reference signals, said function being such that a gain of the control system is modified for a value of said difference which corresponds to a maximum value of the control signal applied to the input of the actuating means so as to reduce jerkiness of hitch movement when said difference changes from said corresponding value; and

means for converting the error signal to the control signal.

4,979,093

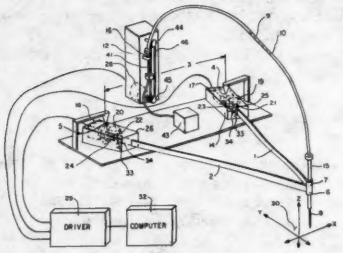
XYZ POSITIONER

Donald D. Laine, San Carlos; Jerry E. Rochte, and Frederick C. Wolcott, both of Los Altos, all of Calif., assignors to Cavro Scientific Instruments, Sunnyvale, Calif.

Continuation of Ser. No. 74,531, Jul. 16, 1987, abandoned. This application May 26, 1989, Ser. No. 361,713

Int. Cl.[5] G05B *19/42*; G05D *3/12*

U.S. Cl. 364—167.01 **23 Claims**



1. An XY positioner comprising

first and second self-suspending sufficiently flexible variable length arms where one end of said first and second variable length arms are connected to first and second turrets at first and second turret positions, respectively,

pivot means connecting the other end of said first and second arms in a pivoting relationship with one another wherein said first and second arms are connected together to form a changeable pivot position, and

control means for changing the length of said first and second arms to obtain a desired XY position, said control means including means for rolling and unrolling said first and second arms wherein said first and second arms either roll or unroll such that said variable lengths change between the respective first and second turret positions and said desired XY position.

4,979,094

CONTROL SYSTEM

David Gemmell, Sutton, and Duncan A. Irvine, Aylesbury, both of United Kingdom, assignors to Possum Controls Limited, Buckinghamshire, United Kingdom

Filed Apr. 4, 1988, Ser. No. 176,882

Claims priority, application United Kingdom, Apr. 7, 1987, 8708314; Feb. 24, 1988, 8804331

Int. Cl.[5] G06F *15/20*; H04Q *9/00*

U.S. Cl. 364—188 **5 Claims**

1. An environmental control system for controlling electrically powered domestic equipment in a dwelling, the control system comprising:

(1) a control unit;

(2) a plurality of input stations each located in a different one of a plurality of rooms in said dwelling;

(3) a plurality of electrically operable switching devices including a plurality of groups of said switching devices, each said group being located in a respective one of said rooms;

(4) sensing and control channel means connecting the control unit to each of said switching devices;

(5) communication channel means connecting the control unit to each of said input stations;

each input station comprising:

(i) visible screen display means;

(ii) an input device; and

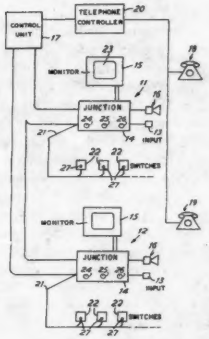
(iii) station identity storage means storing a station identity code;

each electrically operable switching device comprising:

(i) plug means for electrically connecting the device to a domestic power supply socket;

(ii) output power socket means;

(iii) controllable switch means for interconnecting and disconnecting said plug means and said socket means; and



(iv) switching device identity storage means storing a switching device identity code;

said control unit being connected to each said visible display means, to each said input device, and to each said station identity storage means through said communication lines; and said control unit comprising data storage and processing means programmed to distinguish between said identity codes and to respond to solely a selected one of said input devices, said storage and processing means being further programmed:

(a) to select as said one input device the first one of said input devices which is actuated after a predetermined length of time in which none of said input devices is actuated;

(b) to supply display data through said communication channel means to the visible screen display means of solely that input station to which said selected input device belongs to display thereon information comprising status information relating to that one group of said switching devices which is located in the room containing said visible screen display means being supplied; and

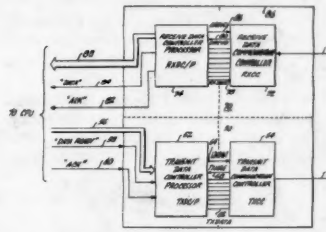
(c) to respond to actuation of said selected input device to control through said sensing and control channel means said one group of switching devices and to indicate such control by display at said visible screen display means being supplied.

4,979,095

APPARATUS AND METHOD FOR A DATA PROCESSING SYSTEM INTERFACE HAVING MULTIPLE BIT PROTOCOL SIGNALS

Mehrdad Ghaffari, Kent, Wash., assignor to Boeing Company

Filed May 31, 1983, Ser. No. 499,215
Int. Cl.[5] G06F *15/16*
U.S. Cl. 364—200 11 Claims



1. In a data processing system wherein data processing units communicate via a multiple line data channel and a control channel, a communication interface for connection to each data processor such that data and control signals are carried over links between the interfaces associated with each data processing unit, the communication interface comprising:

a transmitter section including:

a transmit data controller processor (TXDC/P) having:

(A) multiple data inputs, each data input adapted to be coupled to one of the data processor output data lines,

(B) a control input adapted to be coupled to the data processor control line,

(C) means for producing multiple bit protocol signals, each protocol signal corresponding to one of the data processing unit control line signals,

(D) an output bus, and

(E) a controller for:

(i) responding to data processing control and data signals, and a received TXHRE signal, for predeterminedly loading the protocol signals and data signals to the output bus, and

(ii) issuing a load transmit signal LDXMIT upon loading the output bus;

a transmit data communication controller (TXCC) having:

(A) an input register with multiple inputs coupled to the TXDC/P output bus,

(B) an output means adapted for coupling a signal to the link between communication interfaces,

(C) a controller for:

(i) responding to a LDXMIT signal to load the signal at the TXDC/P output bus into the TXCC input register,

(ii) serially outputting said TXCC input register signal,

(iii) coupling said serial signal to the output means, and

(iv) issuing a TXHRE signal to the TXDC/P; and

a receiver section including:

a receive data communication controller (RXCC) having:

(A) input processing means for predeterminedly processing a signal on the link from another communication interface,

(B) a RXCC register, and

(C) a controller for sequentially loading a link processed signal into the RXCC register and issuing a control signal BRCVD in response to so loading the RXCC register;

a receive data controller processor (RXDC/P) having:

(A) a register having an input bus coupled to the output of the RXCC register,

(B) multiple outputs, each output adapted to be coupled to the data processor receive data and control lines, and,

(C) a controller for:

(i) responding to a BRCVD signal to parallel load the data in the RXCC register into the RXDC/P register,

(ii) identifying a protocol signal and issuing an appropriate control signal on the data processing unit input control channel in response thereto, and,

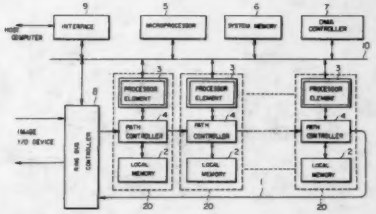
(iii) outputting the RXDC/P register data signal for transmission to the data processing unit.

4,979,096

MULTIPROCESSOR SYSTEM

Hirotada Ueda, Kokubunji; Kanji Kato, Tokorozawa, and Hitoshi Matsushima, Tachikawa, all of Japan, assignors to Hitachi Ltd., Japan

Filed Feb. 17, 1987, Ser. No. 15,380
Claims priority, application Japan, Mar. 8, 1986, 61-51236
Int. Cl.[5] G06F *13/00, 13/37, 13/38*
U.S. Cl. 364—200 13 Claims



1. A multiprocessor system for processing in parallel data of a plurality of partial areas into which data placed in a multidimensional coordinate space is divided, the system comprising:

a plurality of processor elements each for performing, in parallel, a specified selected process on the data of a partial area, each processor element being assigned to a predetermined one of said partial areas;

a plurality of local memories for storing data to be processed by said processor elements, each of said local memories being assigned to a different one of said processor elements;

a plurality of path controllers each connected to a different one of said local memories and the processor element assigned to that local memory, and each path controller including a data latch for latching therein data from an associated local memory and means for selectively transferring data to said data latch, said associated processor element or said associated local memory from a data latch of a preceding path controller, said associated processor element or said associated local memory in accordance with a control signal from said associated processor element, said data latches in the respective path controllers being connected in series with one another in a shift register fashion for latching transferred data; and

control means connected to said data latches for controlling a number of shifts for data along said data latches in said series connection.

4,979,097

METHOD AND APPARATUS FOR INTERCONNECTING BUSSES IN A MULTIBUS COMPUTER SYSTEM

Victoria M. Triolo, Boylston; Elbert Bloom, Southboro, and David W. Hartwell, Boxboro, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

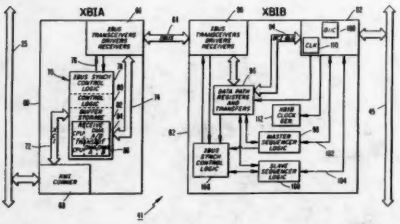
Filed Sep. 4, 1987, Ser. No. 93,479
Int. Cl.[5] G06F *13/00*
U.S. Cl. 364—200 14 Claims

1. A bus adapter for providing an information path between first and second busses in a computer system, the first and

second busses each propagating data during repetitive bus cycles respectively controlled by first and second clock signals, the first bus having a cycle time faster than the second bus, the adapter comprising:

an interconnect bus;

a first adapter module comprising a first interconnect interface circuit connected to the interconnect bus, a first bus interface circuit including means for connection to the first bus, a buffer coupled to the first bus interface circuit for storing data to be transferred from the second bus to the first bus, and first control means coupled to the buffer and the first interconnect interface circuit for asserting a BUFFER AVAILABLE signal on the interconnect bus which indicates when the buffer is ready to receive data, for deasserting the BUFFER AVAILABLE signal only in response to a BUFFER LOADED signal received over the interconnect bus which indicates when data has been transmitted to the first adapter module, and for activating the first bus interface circuit to transmit data from the buffer to the first bus in response to the BUFFER LOADED signal; and



a second adapter module comprising a second interconnect interface circuit connected to the interconnect bus, a second bus interface circuit coupled to the second interconnect interface circuit and including means for connection to the second bus, and second control means coupled to the second interconnect interface circuit and second bus interface circuit for initiating transactions which transfer data between the first and second busses over the interconnect bus is response to signals received over the second bus, the transactions requiring transmission of a predetermined amount of data from the second adapter module to the first adapter module, the second control means comprising means for transmitting data from the second adapter module to the first adapter module over the interconnect bus only when the BUFFER AVAILABLE signal is asserted and means for generating a BUFFER LOADED signal when the predetermined amount of data has been transmitted to the first adapter module.

4,979,098

MULTIPLE ADDRESS SPACE TOKEN DESIGNATION, PROTECTION CONTROLS, DESIGNATION TRANSLATION AND LOOKASIDE

Richard I. Baum; Terry L. Borden, both of Poughkeepsie; Justin R. Butwell, Milton; Carl E. Clark, Poughkeepsie; Alan G. Ganek, Chappaqua, all of N.Y.; James Lum, Redwood City, Calif.; Michael G. Mall, Lagrangeville, N.Y.; Kenneth E. Plambeck; Casper A. Scalzi, both of Poughkeepsie, N.Y.; Richard J. Schmalz; Ronald M. Smith, both of Wappingers Falls, N.Y., and Julian Thomas, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 154,689, Feb. 10, 1988, abandoned.

This application Jun. 8, 1990, Ser. No. 535,248

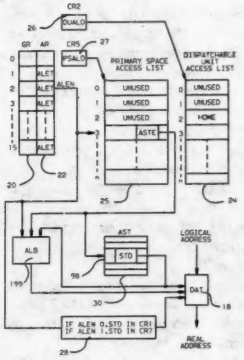
Int. Cl.[5] G06F *12/00, 9/34*

U.S. Cl. 364—200 **23 Claims**

1. Virtual address space control means for selecting one of plural address-translation tables to be used for translating a virtual address of an operand (of an instruction to be executed) to a real address for locating the operand in main storage (MS), a selected address-translation table being required for translating the virtual address to its real MS address, the instruction being executed by a central processor (CP) in a data processing system, the plurality of address-translation tables respectively defining a plurality of virtual address spaces, the CP having general purpose registers (GPRs), the instruction having one or more operands each specifying a virtual address by address components included in a base GPR in another field, or in a base GPR and a non-base GPR and a displacement field, CP hardware/microcode for selecting an address-translation table comprising:

a plurality of access registers (ARs) being respectively associated with the GPRs, and one or more tokens (ALETs) being loadable into one or more of the ARs by a program executing in the CP, each token (ALET) identifying a respective address-translation table defining an address space;

means for locating an entry (ALE) in an access list in MS



with the token in an AR selected by being associated with the GPR selected by the base GPR address component in the instruction operand, the access list providing a set of address spaces that can be limited to only the address spaces required by the executing program; and

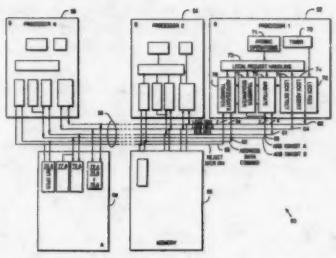
means for addressing a segment table descriptor (STD) in MS with the located ALE and accessing the STD to locate the selected address-translation table required for translating the instruction operand's virtual address to a real MS address, and the integrity of the data processing system being improved due to the above-defined means handling the STD within the CP hardware/microcode to prevent the value of the STD from being available to the executing program while allowing the executing program to control selection among plural STDs by using tokens that have values different from the STD values, not allowing users in problem-state to access the STDs and preventing them from having the potential for destroying their integrity and the operation of obtaining an STD for the token in a selected AR being called an access register translation (ART).

4,979,099

QUASI-FAIR ARBITRATION SCHEME WITH DEFAULT OWNER SPEEDUP

Andrew Milia, Burlington, and Richard G. Bahr, Cambridge, both of Mass., assignors to Apollo Computer Inc., Chelmsford, Mass.

Filed Oct. 25, 1988, Ser. No. 262,574
Int. Cl.[5] G06F *13/14, 13/16, 13/18*
U.S. Cl. 364—200 8 Claims



1. A method of bus arbitration for providing bus ownership to a plurality of devices connected to a bus, comprising the steps of:

assigning to each device a bus ownership class and a priority, wherein a higher class device preempts any lower class device, irrespective of priority;

generating a bus request signal from a first device during a cycle;

generating a bus request signal from a second device during said cycle;

granting ownership of said bus to a higher class device, or if said first and second devices are of the same ownership class, to a higher priority device, during said cycle;

storing, only if said higher priority device is of said lower class, a snapshot signal representative of all bus request signals from each lower class device other than said higher priority device, during the higher priority device's last cycle of bus ownership; and

granting ownership of said bus to each lower class device represented by said snapshot signal at the conclusion of the last cycle of said higher priority device's bus ownership while preventing generation of a bus request signals from said higher priority device until each lower class device represented by said snapshot signal has received and completed ownership of the bus.

4,979,100

COMMUNICATION PROCESSOR FOR A PACKET-SWITCHED NETWORK

Perry Makris, Fairfax; Frederick Choi, Herndon; Mark Klimek, Centreville; James Mapp; Koji Munemoto, both of Herndon; Jeff Nicoll, Chantilly; Mark Soderberg, Sterling, and James A. Moore, Fairfax, all of Va., assignors to Sprint International Communications Corp., Reston, Va.

Filed Apr. 1, 1988, Ser. No. 176,654
Int. Cl.[5] G06F *1/00*
U.S. Cl. 364—200 28 Claims

1. In a packet switch,

input means for receiving data from a source thereof,

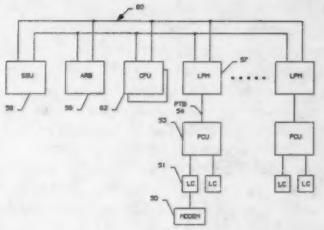
a plurality of processing means for assembling the receive data into packets,

storage means for storing data packets,

bus means for permitting communication between each of said plurality of processing means and said storage means,

arbitration means for deciding which of said plurality of processing means shall be granted access to said bus means, said arbitration means including

programmable means for selectively and alterably designating any of at least two different levels of priority of access



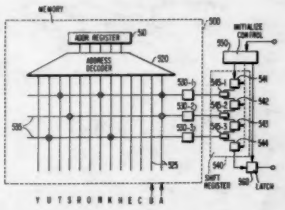
to said bus mans for each of said plurality of processing means whereby to assure greater access to said bus means by those of said plurality of processing means designated for the higher level of priority.

4,979,101

APPARATUS FOR RETRIEVING CHARACTER STRINGS

Kousuke Takahashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 720,930, Apr. 8, 1985, abandoned. This application Dec. 1, 1988, Ser. No. 279,249
Claims priority, application Japan, Apr. 6, 1984, 59-68495; Dec. 19, 1984, 59-267831
Int. Cl.[5] G06F *7/06, 7/20*
U.S. Cl. 364—200 5 Claims



1. An apparatus for receiving a string of input characters and recognizing an approximate match between said string of input characters and a known character string, said apparatus comprising:

first means for receiving a delimiting signal,

second means for receiving a sequence of input signals one by one after said delimiting signal is received, with said sequence of input signals collectively representing said input character string,

a memory circuit having a plurality of input lines each corresponding to one character of a predetermined set of characters which set includes characters contained in said known character string, first to N-th output lines, a plurality of memory cells each coupled to one of said input lines and to one of said output lines with each output line being coupled to a respective group of said memory cells, each of said memory cells being programmed to one of first and second logic states, a memory cell programmed to said first logic state making the output line connected thereto active when the input line connected thereto is selected, a memory cell programmed to said second logic state causing no change to the output line connected thereto when the input line connected thereto is selected, at least two memory cells in each said group memory cells being

programmed to said first logic state, and a selection circuit coupled to said second means and responsive to individual ones of said sequence of input signals received by said second means for selecting one of said input lines corresponding to each said individual one of said sequence of input signals, and

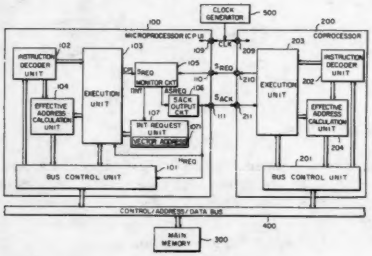
a sequential logic circuit including first to N-th storage circuits each having an input terminal and an output terminal and each storing a single bit of binary data, first to N-th switch circuits, the i-th ($2 \leqq i \leqq N$) switch circuit being connected between the output terminal of the (i−1)-th storage circuit and the input terminal of the i-th storage circuit, a first switch circuit of said first to N-th switch circuits being connected between a start node and the input terminal of a first storage circuit of said first to N-th storage circuits, means for applying a first signal level to said start node in response to the receipt of said delimiting signal, and first to N-th control means, the i-th ($1 \leqq i \leqq N$) control means being coupled to the i-th output line and the i-th switch circuit for making the i-th switch circuit conductive when the i-th output line is made active, the first signal level applied to said start node being transferred to the N-th storage circuit when said first the N-th output lines are made active one by one in the order of said output lines and the first signal level stored in the N-th storage circuit indicating an approximate match between said input character string and said known character string.

4,979,102

MICROPROCESSOR OPERABLE UNDER DIRECT CONNECTION TO COPROCESSOR

Takahiro Tokuume, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 279,795
Claims priority, application Japan, Dec. 3, 1987, 62-307165
Int. Cl.[5] G06F *15/16*
U.S. Cl. 364—200 **6 Claims**



1. A microprocessor for a system in which said microprocessor is interconnected via a bus with a coprocessor and a memory and in which an instruction read out of said memory is applied to and fetched by both said microprocessor and said coprocessor, said microprocessor comprising;

detection means for detecting whether or not an instruction supplied to and fetched by said microprocessor is an instruction to be executed by said coprocessor and for producing a detection signal when said instruction is to be executed to said coprocessor,

a first terminal coupled to said coprocessor, said coprocessor supply said first terminal with an active level when said coprocessor receives and fetches an instruction to be executed by said coprocessor and with an inactive level when said coprocessor receives and fetches an instruction to be executed by said microprocessor, said first terminal being held at said inactive level when said coprocessor is absent from said system,

a second terminal coupled to said coprocessor,

monitor means, coupled to said detection means and to said first terminal and responsive to said detection signal, for monitoring a level of said first terminal and for producing a first signal when said first terminal is at said active level and a second signal when said first terminal is at said inactive level,

output means, coupled to said monitor means and to said second terminal and responsive to said first signal, for outputting a third signal to said second terminal, said coprocessor starting to execute said instruction to be executed by said coprocessor in response to said third signal, and

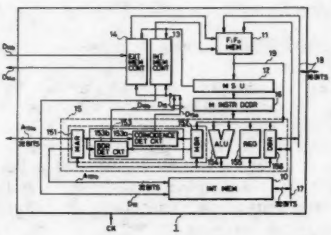
generation means, coupled to said monitor means and responsive to said second signal, for generating an interruption request signal which causes said microprocessor to execute an interruption program routine for processing in the absence of said coprocessor from said system.

4,979,103

DATA PROCESSING METHOD AND APPARATUS HAVING PLURAL BUS INTERFACES

Hiroyuki Kida; Tooru Komagawa, and Hideo Maejima, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 31, 1988, Ser. No. 176,234
Claims priority, application Japan, Mar. 31, 1987, 62-78198
Int. Cl.[5] G06F *3/00*
U.S. Cl. 364—200 **8 Claims**



1. A method of operating a data processing system for processing an operand corresponding to an instruction, which system includes a data processing apparatus having on the same chip an internal memory unit which stores the operand and a central processing unit for processing the operand, comprising the steps of:

memorizing a macroinstruction read out of either an external memory unit in an apparatus located outside said chip or said internal memory unit;

decoding said macroinstruction to produce a decoded signal;

outputting an instruction for controlling said central processing unit based on the decoded signal;

discriminating whether said operand is stored in said internal memory unit or in said external memory unit based on said instruction for controlling said central processing unit;

retrieving said operand from said external memory when the result of said discriminating indicates that said operand is stored in said external memory;

retrieving said operand from said internal memory when the result of said discriminating indicates that said operand is stored in said internal memory; and

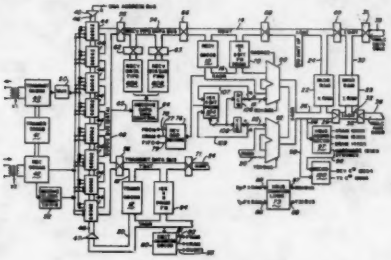
reading said operand to a register for performing an operation by said central processing unit after retrieving said operand from said external memory unit or said internal memory unit.

4,979,104

DUAL MICROPROCESSOR CONTROL SYSTEM

Thomas O. Holtey, Newton, Mass.; Thomas L. Murray, Jr., Hollis, N.H.; Wayne A. Perzan, Holbrook, Mass., and Scott W. Smith, Hudson, N.H., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed Mar. 31, 1987, Ser. No. 32,902
Int. Cl.[5] G06F 9/00
U.S. Cl. 364—200 33 Claims



1. A dual microprocessor control system comprising;
a first microprocessor,
first address and data busses associated with said first microprocessor,
a second microprocessor,
second address and data busses associated with said second microprocessor,
memory means having address and data busses associated therewith,
means intercoupling the first and second microprocessor data busses to the memory means data bus,
means intercoupling the first and second microprocessor address busses to the memory means address bus including first and second means for establishing channel numbers, corresponding by number to line tables of said memory means, and for storing an indication of the active channel number associated with respective with first and second microprocessors, and control means for changing numbers and thus memory means addressing, but preventing the means for establishing for each microprocessor from addressing the same channel simultaneously,
said control means having means for receiving channel number signals from both said first and second means, having a control input for receiving a control signal for selection of which channel number is to change and having means coupling to said first and second means for establishing channel number change.

4,979,105

METHOD AND APPARATUS FOR AUTOMATIC RECOVERY FROM EXCESSIVE SPIN LOOPS IN AN N-WAY MULTIPROCESSING SYSTEM

James C. Daly, Millbrook; Jeffrey M. Nick, Fishkill, and Franklin J. Rodegeb, Wappingers Falls, all of N.Y., assignors to International Business Machines, Armonk, N.Y.

Filed Jul. 19, 1988, Ser. No. 221,169
Int. Cl.[5] G06F 11/00
U.S. Cl. 364—200 11 Claims

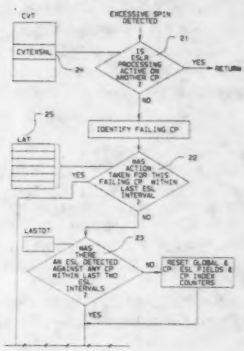
1. In a multiprocessing system complex comprising at least two processors, an operating system, and resources shared among said processors, a method for recognition of and automatic recovery from excessive spin loops by the operating system comprising the steps of:

(A) detecting, by a detecting routine in a detecting processor, that said detecting processor has been in a spin loop requiring a resource held by a resource-holding routine in another processor for a fixed time period;

(B) identifying a target processor in said system complex as a cause of said another processor holding said resource for said fixed time period, and so being a target for responsive recovery action;

(C) performing no responsive recovery actions if a bypass indicator set by a routine in said target processor so indicates;

(D) automatically performing for said target processor one



of a hierarchical sequence of responsive programmed recovery actions if said bypass indicator is off;

(E) continuing to identify said target and to perform subsequent hierarchical recovery actions for said target processor until said target processor is no longer so identified as said target;

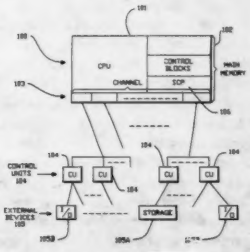
(F) continuing to so detect the holding of any of said resources for said fixed time period and to identify target processors and perform target processor-specific hierarchical recovery actions until said any of said resources are acquired by said detecting processor.

4,979,106

CUSTOMIZATION OF A SYSTEM CONTROL PROGRAM IN RESPONSE TO INITIALIZATION OF A COMPUTER SYSTEM

Frederick W. Schneider, Mountain View, Calif., assignor to Amdahl Corporation, Sunnyvale, Calif.

Filed Aug. 29, 1988, Ser. No. 237,890
Int. Cl.[5] G06F 9/44
U.S. Cl. 364—200 20 Claims



1. A method of operating a computer system under the control of a system control program, the computer system

being capable of multiple initializations, the computer system being capable of having different operating configurations and characteristics, including a main memory with selectable size, and including a selectable number of input/output channels, each channel capable of communicating with more than one external device with different operating characteristics, the method comprising the steps of:

performing in the computer system one or more instructions to cause investigation, at each initialization of the computer system, of the operating characteristics and configuration of the computer system; and

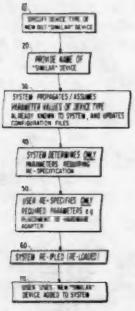
adjusting the system control program, under control of the computer system in response to said investigation after each initialization of the computer system, whereby the system control program is enabled to control the computer system as a function of the operating characteristics and configuration of the computer system.

4,979,107

MODIFICATION OF DEVICE CONFIGURATION WHEREIN THE SYSTEM SPECIFIES AND PROMPTS THE USER WITH ONLY PARAMETERS REQUIRED TO BE CHANGED

Hira Advani, and William L. Terrell, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 703,922, Feb. 21, 1985, abandoned.
This application Dec. 11, 1987, Ser. No. 132,672
Int. Cl.[5] G06F *3/023, 3/14*
U.S. Cl. 364--200 3 Claims



1. A computer process for the modification of device configuration in a computer system by a user, said computer system storing parameter values of various default device types and device types already installed in the system, said computer process comprising the steps of

responding to a user initiated reconfiguration command by prompting the user to enter one of a plurality of commands including an add device command,

responding to the add device command entered by the user by prompting the user to enter the name of a default device or a similar device already installed in the system,

determining from the stored parameter values for the default or similar device named by the user those parameters which must be re-specified by the user for the device to be added and then prompting the user to enter only those parameters requiring re-specification, and

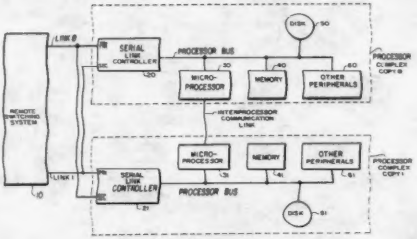
storing the parameters entered by the user for the device to be added together with those parameters common to both the default or similar device named by the user and the added device, thereby installing the added device in said computer system.

4,979,108

TASK SYNCHRONIZATION ARRANGEMENT AND METHOD FOR REMOTE DUPLEX PROCESSORS

Edwin P. Crabbe, Jr., Peoria, Ariz., assignor to AG Communication Systems Corporation, Phoenix, Ariz.

Continuation of Ser. No. 811,798, Dec. 20, 1985, abandoned.
This application Dec. 26, 1989, Ser. No. 455,891
Int. Cl.[5] G06F *11/00, 11/14, 11/16, 11/34*
U.S. Cl. 364—200 13 Claims



1. In a data transmission system including a remote system for transmitting and receiving data which is connected to duplex copies including a first functionally complete copy and a second functionally complete copy, of a data processing system, a task synchronization arrangement comprising:

first data link means connected between said remote system and each of said duplex copies of said data processing system;

second data link means connected between said remote system and each of said duplex copies of said data processing system;

said first data link means being connected as a primary data link means to said first functionally complete copy of said data processing system and said first data link means being connected as a secondary data link means to said second functionally complete copy of said data processing system;

said second data link means being connected as a primary data link means to said second functionally complete copy of said data processing system and said second data link means being connected as a secondary data link means to said first functionally complete copy of said data processing system;

each said functionally complete copy of said data processing system including:

link controller means connected to said first and second data link means and being operated to transmit and to receive data from said remote system via said first and said second data link means;

processor means connected to said link controller means and being operated to control transmission and reception of said data between said remote system and one corresponding functionally complete copy of said data processing system;

disk memory means connected to said link controller means and to said processor means, said disk memory means being operated in response to said processor means to store said received data transmitted from said remote system; and

said processor means being further operated, after completing said storing of said data in said disk memory means, to transmit a completion message to said remote system, responsive to said processor means establishing that said processor means is connected through the primary data link means to said remote system;

said task synchronization arrangement further comprising:

said processor means of said first functionally complete copy of said data processing system being connected to said processor means of said second functionally complete

copy of said data processing system, one said processor means of said first functionally complete copy being operated to transmit data to and to receive data from said processor means of said second functionally complete copy and said processor means of said second functionally complete copy being operated to transmit data to and to receive data from said processor means of said first functionally complete copy;

under control of each of said functionally complete copy of said data processing system, a means for calculating a checksum, said means for calculating a checksum calculates a checksum of data received from said first data link means or said second data link means; and,

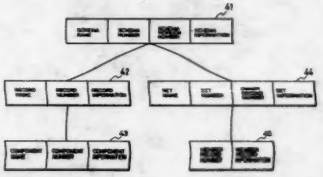
under control of each of said functionally complete copy of said data processing system, a means for first checksum comparison, said means for first checksum comparison operated to compare a received checksum with calculated checksum and to generate a successful indication or an unsuccessful indication, wherein each of said functionally complete copy of said data processing operates asynchronously, or alternatively, each said functionally complete copy of said data processing operates synchronously.

4,979,109

METHOD OF CONTROLLING A DATA DICTIONARY DIRECTORY SYSTEM IN A DATA BASE SYSTEM

Kazuaki Tanaka, Sagamihara; Ichiro Yokoyama, Ebina; Satoshi Wakayama, Kawasaki; Yoshito Kamegi, Yokohama; Makoto Urakawa, Yokohama; Mikihiko Tokunaga, Yokohama; Takeshi Kamoshida, Yokohama; Shigeru Yoneda, Ebina, and Kiyotaka Kiyasu, Yokohama, all of Japan, assignors to Hitachi Ltd.

Filed Jan. 14, 1987, Ser. No. 3,255
Claims priority, application Japan, Jan. 27, 1986, 61-13805
Int. Cl.[5] G06F 15/40, 7/00, 9/38
U.S. Cl. 364—200 13 Claims



5. In a data base system having a data dictionary system to control access to the data base system, said data dictionary system including a dictionary which registers definition informations, including definition information and its related definition information, to specify the structure of said data base system, and said dictionary further including schema and subschema informations, a method for controlling said data base system comprising the steps of:

(a) a step which registers said definition informations into said dictionary;

(b) a step which determines whether it is necessary to confirm the coordination for said definition informations registered in said dictionary according to a confirmation request from a user;

(c) a step which confirms the coordination of said definition informations when it is determined by step (b) that confirmation is requested; and

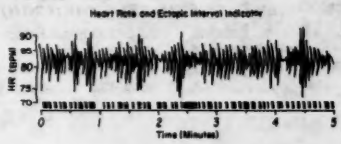
(d) a step which writes a schema number into said subschema information when coordination is confirmed by step (c).

4,979,110

CHARACTERIZING THE STATISTICAL PROPERTIES OF A BIOLOGICAL SIGNAL

Paul Albrecht, Weston, and Richard J. Cohen, Waban, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Sep. 22, 1988, Ser. No. 247,738
Int. Cl.[5] G06F 15/42
U.S. Cl. 364—413.03 19 Claims



1. Method for characterizing the fluctuations of a signal representing an underlying biological process, said signal being intermittently obscured by a relatively independent process resulting in a corrupted signal comprising:

noting the time intervals during which the obscuring process is occurring,

constructing from the intervals a windowing function which makes a transition from one towards zero as the process obscures the signal and a transition towards one as the process terminates, and

using the windowing function to weight the relative contributions of corresponding segments of the corrupted signal to create a new signal,

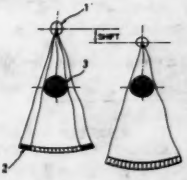
whereby a characterization of the statistical properties of the new signal can be made to approximate the characterization of the statistical properties of the signal in the absence of the effect of the obscuring process.

4,979,111

CT IMAGE PROCESSOR USING DATA EXPANSION FOR REDUCING STRUCTURAL NOISE IN REARRANGEMENT

Hiroshi Nishimura, Chiba, Japan, assignor to Hitachi Medical Corporation, Tokyo, Japan

Continuation of Ser. No. 826,982, Feb. 7, 1986, abandoned. This application Jul. 3, 1989, Ser. No. 374,553
Claims priority, application Japan, Feb. 13, 1985, 60-24560
Int. Cl.[5] G06F 15/42
U.S. Cl. 364—413.16 6 Claims



1. In a CT picture image processor for use in X-ray computerized tomograph including an X-ray source for providing fan beams on an object being examined; a multi-channel X-ray detector for detecting said fan beams transmitted through said object; and processing means for reproducing a sectional image of said object by a back projection of the signal obtained from said multi-channel X-ray detector, the improvement comprising;

said processing means including rearranging means for rearranging the order of projected data corresponding to said fan beams into plural neighboring rearranged projected data corresponding to parallel beams; and interpolative means for effecting interpolative operation on said plural

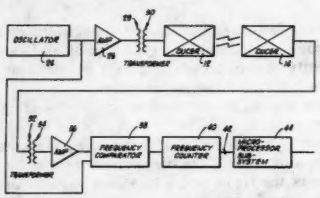
neighboring rearranged projected data so as to use the interpolated data for said back projection, said interpolative means comprising means for scaling up said interpolative operation by a 1:n factor where n may be any rational number and wherein the value of n is related to a width dimension of the object being examined.

4,979,112

METHOD AND APPARATUS FOR ACOUSTIC MEASUREMENT OF MUD FLOW DOWNHOLE

Carl C. Ketcham, Bennion, Utah, assignor to Baker Hughes Incorporated, Houston, Tex.

Continuation of Ser. No. 192,530, May 11, 1988, abandoned.
This application Jul. 17, 1990, Ser. No. 554,081
Int. Cl.[5] G01V *1/40*
U.S. Cl. 364—422 **6 Claims**



1. An apparatus for communicating information between first and second locations remote from each other and linked by a fluid-conducting conduit containing a fluid flowing from said first location to said second location at a basal velocity in excess of zero, the majority of said conduit being disposed in a well bore, said apparatus comprising:

means at said first location for selectively changing the velocity of said flowing fluid;

means at said second location for:

(a) measuring incremental changes in the fluid velocity;

(b) determining whether said change increments fall within one of a plurality of predetermined ranges of error, each range of error including a unique upper and a unique lower flow rate bound, and each range of error being separated from a neighboring range of error by a non-zero range of fluid velocities;

(c) associating each of at least three different measured fluid velocities whose change increment was determined to fall within one of said predetermined ranges of error, one of said at least three fluid velocities being the basal fluid velocity, with a predetermined unique information bit; and

(d) assembling a plurality of said unique information bits into a word.

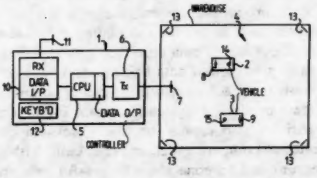
4,979,113

AUTOMATED VEHICLE CONTROL

Malcolm T. Roberts, Oadby; Michael P. Robins, Rugby, and Ian E. Sharrott, Stoney Stanton, all of England, assignors to The General Electric Company, plc, England

Filed May 2, 1989, Ser. No. 346,128
Claims priority, application United Kingdom, May 13, 1988, 8811441
Int. Cl.[5] G06F *15/50*
U.S. Cl. 364—424.02 **4 Claims**

4. A vehicle control and guidance system, comprising: computer means for generating signals to control a plurality of vehicles to execute movements over a floor within a predetermined area, and operative for storing data identifying locations of notional points on the floor of said area; means operable by a user of the system for entering into the computer means a look-up table which specifies a plurality of pairs of said points for each of said pairs a vehicle movement will be required between one point and the other point of said pair, and said look-up table also specifies, for each required vehicle movement, other pairs of said plurality of pairs of points which define vehicle movements which must be considered as potentially resulting in collision with a vehicle making said required movement; and means for requesting movement of a first vehicle between a first said pair of points; said computer means



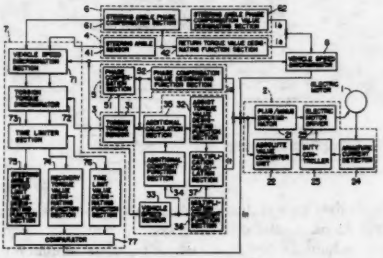
being operative, when said movement of said first vehicle is requested, to determine from said table which potential collision movements must be considered, and to determine whether any vehicle is carrying out any of said potential collision movements, and, if so, to inhibit said requested movement of said first vehicle and, if not, to initiate said requested movement of said first vehicle.

4,979,114

MOTOR CONTROL APPARATUS FOR ELECTRIC POWER STEERING SYSTEM

Saiichiro Oshita; Toyohiko Mouri, and Tsutomu Takahashi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 341,043
Claims priority, application Japan, Apr. 21, 1988, 63-99859; May 20, 1988, 63-124072; May 20, 1988, 63-124073
Int. Cl.[5] B62D *5/04*
U.S. Cl. 364—424.05 **12 Claims**



1. A motor control apparatus for an electric power steering system mounted on a vehicle, having wheels, a steering wheel operatively connected to said wheels, an electric motor for assisting the operation of said steering wheel, a torsion torque sensor for detecting a torsion torque of said steering system, a vehicle speed sensor for detecting a vehicle speed, a steering angle sensor for detecting a steering angle of said wheels, and means responsive to said torsion torque, said vehicle speed and said steering angle for controlling a rotational direction and torque of said electric motor so as to assist the operation of said steering wheel, comprising:

judging means responsive to said torsion torque and said vehicle speed for judging a stopping state of said vehicle; and

generating means for generating a recovery signal to said electric motor to return said steering wheel to a neutral

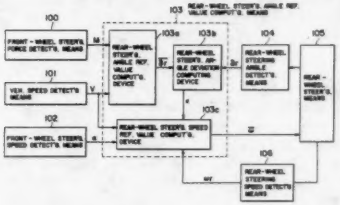
position when the stopping state is judged by said judging means.

4,979,115

METHOD AND DEVICE FOR CONTROLLING REAR-WHEEL STEERING OF AUTOMOTIVE VEHICLE

Akira Takahashi, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 21, 1989, Ser. No. 312,472
Claims priority, application Japan, Feb. 25, 1988, 63-42810
Int. Cl.[5] B62D 6/02
U.S. Cl. 364—424.05 **12 Claims**



1. A method for controlling rear-wheel steering of an automotive vehicle having a steering wheel, front wheels, rear wheels, a front-wheel steering mechanism operatively connected to the steering wheel for operating the front wheels, a rear-wheel steering mechanism for operating the rear wheels, a detection device for detecting an assist steering torque, a first sensor for sensing rotational direction and speed of the steering wheel, a second sensor for sensing vehicle speed, a third sensor for sensing an actual rear-wheel steering angle, a fourth sensor for sensing a rear-wheel steering speed, and a control unit responsive to output signals from said detection device and said sensors for controlling the rear-wheel steering mechanism to steer the rear wheels in a reverse-phase direction relative to the front wheels at least in a lower vehicle speed than a predetermined vehicle speed, said method comprising the steps of:

computing a reference rear-wheel steering angle in response to said assist steering torque from said detection device and said vehicle speed from said second sensor;

calculating a deviation between said reference rear-wheel steering angle from said computing step and said actual rear-wheel steering angle from said third sensor;

determining a reference rear-wheel steering speed in response to said deviation from said calculating step and output signals from said first, second, and fourth sensors, said reference rear-wheel steering speed being varied to increase reverse-phase direction steering speed of the rear wheels for low front-wheel steering speed and to reduce the reverse-phase direction steering speed of the rear wheels for high front-wheel steering speed; and

controlling said rear-wheel steering mechanism to steer said rear wheels in response to said reference rear-wheel steering speed from said determining step until said deviation reaches zero.

4,979,116

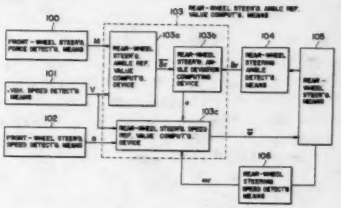
METHOD AND DEVICE FOR REAR WHEEL STEERING SYSTEM OF AUTOMOTIVE VEHICLE

Akira Takahashi, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 21, 1989, Ser. No. 312,493
Claims priority, application Japan, Feb. 25, 1988, 63-42809
Int. Cl.[5] B62D 6/02
U.S. Cl. 364—424.05 **14 Claims**

1. A method for controlling rear-wheel steering of an automotive vehicle having a steering wheel, front wheels, rear wheels, a front-wheel steering mechanism operatively connected to the steering wheel for operating the front wheels, a rear-wheel steering mechanism for operating the rear wheels, a detection device for detecting an assist steering torque, a first sensor for sensing a rotational direction and speed of the steering wheel, a second sensor for sensing a vehicle speed, a third sensor for sensing an actual rear-wheel steering angle, a fourth sensor for sensing a front-wheel steering speed, a fifth sensor for sensing a rear-wheel steering speed, and a control unit responsive to output signals from said detection device and said sensors for controlling the rear-wheel steering mechanism to steer the rear wheels in a coincident-phase direction relative to the front wheels in a medium or high vehicle speed region, said method comprising the steps of:

computing a reference rear-wheel steering angle in response to said assist steering torque from said detection device and said vehicle speed from said second sensor;



calculating a deviation between said reference rear-wheel steering angle from said computing step and said actual rear-wheel steering angle from said third sensor;

determining a reference rear-wheel steering speed in response to said deviation from said calculating step and output signals from said second, fourth, and fifth sensors, said reference rear-wheel steering speed being varied depending on said front-wheel steering speed from said fourth sensor to reduce a coincident-phase direction steering speed of the rear wheels for low front-wheel steering speed and to increase the coincident-phase direction steering speed of the rear wheels for high front-wheel steering speed; and

controlling said rear-wheel steering mechanism to steer said rear wheels in response to said reference rear-wheel steering speed from said determining step until said deviation reaches zero.

4,979,117

METHOD OF PROCESSING MALFUNCTION OF VEHICULAR ACCELERATION SENSOR

Toshihiro Hattori, Ayase; Masaki Ishihara, Fujisawa; Hitoshi Kasai, Kawasaki, and Shigeki Moride, Yokosuka, all of Japan, assignors to Isuzu Motors, Limited, Tokyo, Japan

Continuation of Ser. No. 70,118, Jul. 6, 1987, abandoned, which is a continuation of Ser. No. 686,545, Dec. 20, 1984, abandoned. This application Sep. 5, 1989, Ser. No. 402,871
Int. Cl.[5] F02D 41/22
U.S. Cl. 364—431.07 **6 Claims**

1. A method of processing a malfunction of an acceleration sensor of a motor vehicle, comprising the steps of:

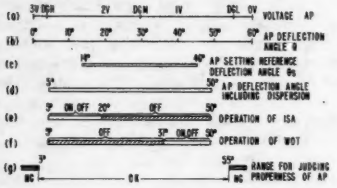
(a) outputting an output voltage according to changes in a resistance depending upon actuation of an accelerator;

(b) detecting that said output voltage falls outside of a predetermined voltage range, to judge the malfunction of said acceleration sensor;

(c) determining whether said accelerator is in an idle position or not based on a signal from an idle switch for detecting the idle position of said accelerator;

(d) determining whether said accelerator is in a wide-open position or not, based on a signal from a wide-open switch for detecting the wide open position of said accelerator; and

(e) setting an acceleration value at a predetermined value dependent on the position of said accelerator based on the



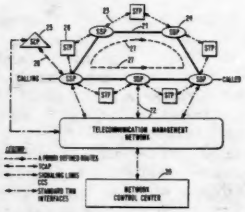
signals from said idle switch and said wide-open switch when the malfunction of said accelerator is detected.

4,979,118

PREDICTIVE ACCESS-CONTROL AND ROUTING SYSTEM FOR INTEGRATED SERVICES TELECOMMUNICATION NETWORKS

Shaygan Kheradpir, Brookline, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 10, 1989, Ser. No. 321,710
Int. Cl.[5] H04M *7/06*
U.S. Cl. 364—436 **31 Claims**



1. A predictive system for controlling access to and for routing traffic through a network comprising nodes wherein each node is adapted to communicate with each of the other nodes, an interconnection of said nodes constituting a network topology, said system comprising:

a network control center having a central computer;

a plurality of nodes in said network, each of said nodes being an intelligent, software controlled switch having a routing table;

each node having outgoing trunk groups connected thereto and being connected via a data link to said computer in said network control center;

each of said nodes comprising:

(a) means to measure a current occupancy state of each of said nodes outgoing trunk groups to determine instantaneous node-to-node link occupancies and to transmit said current state of link occupancies to said network control center;

(b) means to count each of said nodes number of attempts as source node to reach each of said other nodes as a destination node during a time interval to determine source-destination arrival rates for said interval, and to send said source-destination arrival rates to said network control center;

a routing topology comprising a set of a priori defined routes from each node as a source to every other node as a destination, each route having one or more links between nodes in said network;

means to predict source-destination arrival rates for a succeeding time interval based on the actual arrival rates during a current time interval;

means to predict trunk group occupancy on each link of said network at the end of a next succeeding time interval using as inputs said instantaneous link occupancy measurements, said predicted source-destination arrival rates, said network topology, and said routing topology;

means to calculate traffic control variables for each source-destination pair of nodes wherein said traffic control variables specify a percentage of incoming traffic to be offered to each route of each source-destination pair for the next time interval;

means to transmit said traffic control variables to said intelligent switches for use during the next time interval; and

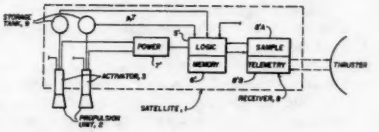
said intelligent switches updating said routing tables and allocating arriving traffic among said source-destination routes according to said traffic control parameters for the next time interval.

4,979,119

METHOD AND SYSTEM FOR MONITORING THE PROPELLANT CONSUMPTION OF A SPACE VEHICLE

Michel Perdu, Frejus, France, assignor to Societe Nationale Industrielle et Aerospatiale, Paris, France

Filed Sep. 12, 1988, Ser. No. 247,434
Claims priority, application France, Sep. 11, 1987, 87 12631
Int. Cl.[5] G01F *1/80, 9/00, 15/075;* B64G *1/40*
U.S. Cl. 364—442 **18 Claims**



9. System for monitoring the propellant consumption of a space vehicle equipped with a plurality of propulsion units having activator means associated with said propulsion units and having a control unit adapted to apply activation instructions to said activator means, the system comprising:

a logic unit in said control unit,

a memory area of said logic unit adapted to store the number N and the cumulative duration S of said activation instructions from reference times,

a power stage adapted to apply said activation instructions to said activator means according to logic signals produced by said logic unit,

a unit adapted to sample the contents of said memory area at each reference time and to transmit the ground a telemetry signal representing said contents, and

means for computing the mass M of propellant consumed since the reference time from the equation:

$$M \times f(N) + g(S) .$$

4,979,120

CONTROL SYSTEM FOR AUTOMATIC ADJUSTMENT OF LATHE KNIFE PITCH

Gary W. Ely, Canby, Oreg., assignor to The Coe Manufacturing Company, Painesville, Ohio

Filed Nov. 28, 1988, Ser. No. 276,969
Int. Cl.[5] G06F *15/46;* B27L *5/02*
U.S. Cl. 364—474.09 **20 Claims**

1. Veneer lathe apparatus with automatic adjustment of the knife pitch angle, comprising:

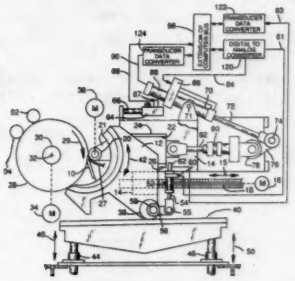
drive means for rotating a log;

main carriage means for moving the lathe knife toward said log to peel veneer from the log;

knife carriage means for supporting the lathe knife and being pivotally mounted on said main carriage means to change the pitch angle of said knife;

pitch rail cam means for guiding the movement of said knife carriage means along a mechanical pitch rail;

cam follower means mounted on said knife carriage means for engagement with said pitch rail cam means to cause said knife carriage to pivot as said cam follower means moves along said pitch rail cam means to adjust the pitch



angle of said knife through a range of pitch angles during peeling as the main carriage is moved toward the log; and

control means for automatically adjusting the position of said cam follower means on said knife carriage means in response to changes in the position of said main carriage means to vary said range of pitch angles.

4,979,121

CONTROL METHOD AND APPARATUS FOR CONTROLLING MACHINING OPERATIONS IN A MACHINE TOOL HAVING A PLURALITY OF COORDINATE SYSTEMS

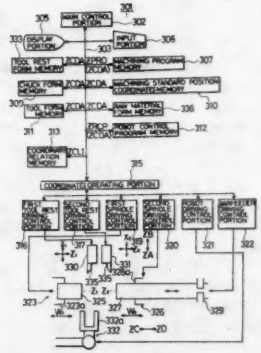
Toshihiko Inoue; Kazuki Uemura; Katsushi Oshima; Hajime Ohashi, all of Aichi, and Yuji Sano, Gifu, all of Japan, assignors to Yamazaki Mazak Corporation, Aichi, Japan

Filed Jul. 1, 1988, Ser. No. 214,642

Claims priority, application Japan, Sep. 25, 1987, 62-241521; Sep. 25, 1987, 62-241520

Int. Cl.[5] G06F *15/46;* **G05B** *19/18*

U.S. Cl. 364—474.36 **12 Claims**



1. A machining control method in a machine tool, said machine tool having at least three control coordinate systems and controlled objects to be driven and controlled on the basis of respective corresponding said control coordinate systems, said machining control method comprising the steps of:

providing a coordinate system data memory, said coordinate system data memory storing dimensional information corresponding to each said control system as coordinate system data;

providing a coordinate relation memory, said coordinate relation memory storing coordinate position relation information specifying the positional relationships between each of said control coordinate systems;

reading coordinate system data from said coordinate system data memory when each said controlled object corresponding to a respective said control coordinate system is driven and coordinate system data is needed corresponding to the other said control coordinate systems, said coordinate system data read from said coordinate system data memory corresponding to each of said control coordinate systems except said control coordinate system corresponding to said driven controlled object, and converting said coordinate system data read from said coordinate system data memory from said control coordinate systems to which said read coordinate system data correspond into said control coordinate system corresponding to said driven controlled object with said coordinate position relation information stored in said coordinate relation memory; and

controlling said controlled object on the basis of the converted coordinate system data, and optionally controlling and driving an optionally controlled object of the other said controlled objects on the basis of the coordinate system data of its respective said control coordinate system.

4,979,122

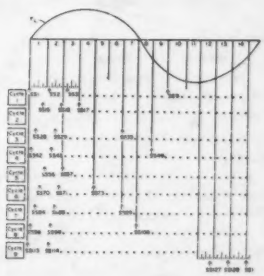
APPARATUS AND METHOD FOR MONITORING POWER

Richard K. Davis, Crozet, and Keith W. Curtin, Charlottesville, both of Va., assignors to GE Fanuc Automation North America Inc., Charlottesville, Va.

Filed Feb. 1, 1989, Ser. No. 304,530

Int. Cl.[5] G06F *15/56, 15/74*

U.S. Cl. 364—483 **32 Claims**



1. A power monitor for monitoring power associated with a periodic signal comprising:

sampling means for sampling said signal during an observation window, said window including a plurality of cycles of said signal, to generate a plurality of voltage-current sample sets; and

timing means, coupled to said sampling means, for timing the sampling of said signal such that said voltage-current sample sets are distributed in time at different time positions from cycle to cycle within said observation window relative to the beginning of each cycle.

4,979,123

APPARATUS FOR DETERMINING CONCENTRATIONS OF MINERAL ELEMENTS

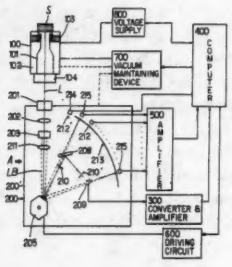
Keun Y. Yang, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed May 27, 1988, Ser. No. 199,765

Claims priority, application Rep. of Korea, May 30, 1987, 5527

Int. Cl.[5] G01J *3/44, 3/32, 3/28, 3/06*

U.S. Cl. 364—498 **5 Claims**



1. An apparatus for determining concentrations of mineral elements which comprises:

a glow discharge lamp having a first window for atomizing and exciting the mineral elements to be measured so as to emit a light through the first window,

a combined vacuum maintaining device and argon gas supply system for maintaining a vacuum condition in and supplying argon gas to the interior of the glow discharge lamp,

a high voltage supply member for supplying a high voltage to the glow discharge lamp,

a spectrometer operatively associated with said glow discharge lamp, said spectrometer including:

a first focusing lens disposed on an inlet slit for directly focusing the light emitted from the glow discharge lamp through a second window disposed in the spectrometer,

a laser beam generator in the vicinity of said first focusing lens for generating a laser beam,

a second focusing lens in the vicinity of said laser beam for directly focusing the laser beam generated from the laser beam,

a rotary polyhedron disposed in said spectrometer, said rotary polyhedron containing:

a rotary grating for diffracting a light focused from the first focusing lens,

a first reflecting mirror for reflecting the laser beam generated from the laser beam through the second focusing lens, and

a drive motor for driving the rotary polyhedron,

a second reflecting mirror in the vicinity of rotary polyhedron for reflecting alight diffracted from the rotary grating of the rotary polyhedron, said second reflecting mirror provided with inlet and outlet slits disposed at both sides thereof for reflecting a light diffracted from the grating and the second reflecting mirror, respectively,

a photomultiplier tube detecting a light reflected from the second mirror and determining a strength of the light,

a slit plate having a plurality of slits arranged in a circular configuration position for allowing to pass the laser beam reflected from the first reflecting mirror therethrough,

a plurality of photo diodes in the vicinity of the corresponding slits of said slit plate for analyzing a wavelength and detecting the wavelength of the light diffracted from the second mirror,

an indicating slit adjacent to said plurality of photo diodes for indicating an initiating point of scanning of the laser beam, and

a sensing photo diode adjacent to said indicating slit for sensing initiating point of scanning of the laser beam,

a combined amplifier and A/D converter operatively associated with said spectrometer for amplifying an electric signal from the photomultiplier tube of the spectrometer and converting said amplified signal into a digital signal,

an amplifier operatively associated with said spectrometer for amplifying signals from the plurality of photo diodes, and

a computer associated with said spectrometers, digital amplifier and A/D converter, and amplifier for receiving signals transmitted from the digital amplifier and A/D converter, whereby the apparatus can easily measure the concentrations of mineral elements of an alloy.

4,979,124

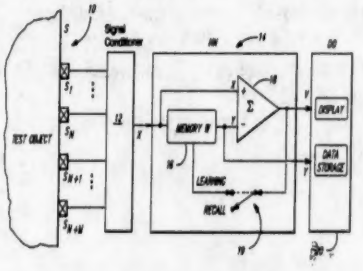
ADAPTIVE, NEURAL-BASED SIGNAL PROCESSOR

Wolfgang H. Sachse, Ithaca, N.Y., and D. Igor Grabec, Ljubljana, Yugoslavia, assignors to Cornell Research Foundation, Ithaca, N.Y.

Filed Oct. 5, 1988, Ser. No. 253,837

Int. Cl.[5] G06F *15/46;* G01N *29/00*

U.S. Cl. 364—507 **34 Claims**



1. A neural-like processing method for analyzing acoustic emission signals that emanate from a medium under test, comprising the steps of:

(a) obtaining acoustic emission signals emanating from a medium under test to which a known source signal has been applied;

(b) encoding said known source signal with a descriptor characteristic of said known source signal, such as its location with respect to the medium, its strength, and its time function;

(c) concatenating said obtained acoustic emission signals to form a series chain of acoustic emission signals defining a pattern vector representative of said medium under test;

(d) appending said known source descriptor to said series chain;

(e) introducing said pattern vector to a storage medium;

(f) repeating steps (a) through (e) a number of times in order to establish a data base characterizing the medium and its response to known source signals; and

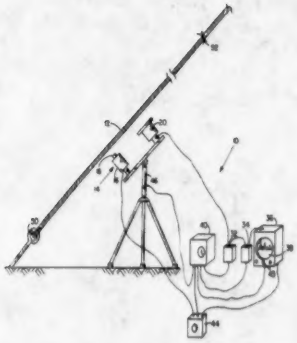
(g) synthesizing from said data base in said storage medium, characteristics of an unknown source based upon simulated acoustic emissions, or characteristics of acoustic emissions based upon a simulated unknown source.

4,979,125

NON-DESTRUCTIVE EVALUATION OF ROPES BY USING TRANSVERSE IMPULSE VIBRATIONAL WAVE METHOD

Hegeon Kwun, and Gary L. Burkhardt, both of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Continuation of Ser. No. 122,763, Nov. 19, 1987, abandoned. This application Apr. 13, 1990, Ser. No. 512,037
Int. Cl.[5] G01N *29/04*; G06F *15/46*
U.S. Cl. 364—507 11 Claims



8. An apparatus for testing a rope under tension comprising:

means for striking said rope transversely at a single point to produce an incident vibrational wave along said rope, said incident vibrational wave producing flaw-reflected waves upon encountering a flaw in said rope and producing end-reflected waves upon encountering an end of said rope;

sensor means fixed in a position adjacent said rope for detecting said flaw-reflected waves and said end-reflected waves in said rope at a single point, said sensor means producing an electrical signal having amplitudes and a time distribution proportional to said flaw-reflected waves and said end-reflected waves;

means for amplifying said amplitudes of said electrical signal to detectable and measurable levels; and

means for analyzing said electrical signal, said analyzing means detecting and measuring said amplitudes and said time distribution of said electrical signal and discriminating a first portion of said electrical signal indicative of said flaw-reflected waves from a second portion of said electrical signal indicative of said end-reflected waves, so as to locate said flaw.

4,979,126

NEURAL NETWORK WITH NON-LINEAR TRANSFORMATIONS

Yoh-Han Pao, and Farrokh Khatibi, both of Cleveland Heights, Ohio, assignors to AI Ware Incorporated, Cleveland, Ohio

Filed Mar. 30, 1988, Ser. No. 175,184
Int. Cl.[5] G06F *15/18*
U.S. Cl. 364—513 15 Claims

1. A neural network system comprising:

a plurality of processing nodes arranged into at least first and second layers;

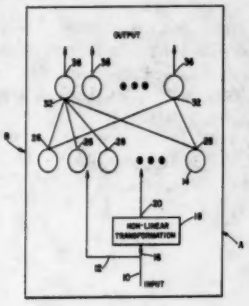
input means adapted for receiving an input signal comprising data representative of an input pattern;

first communication means for communicating at least a portion of the input signal to at least a first portion of the processing nodes of the first layer;

transformation means for performing a non-linear transform on a signal input thereto to form a transformed signal as an output thereof;

second communication means for communicating at least a portion of the input pattern to the transformation means;

third communication means for communicating the transformed signal resultant from operation of the transform means to at least a second portion of the processing nodes of the first layer uniquely defined from the processing nodes of the first portion;



fourth communication means for communicating the output of processing nodes of the first portion and of the second portion of the first layer to at least a first portion of the processing nodes of the second layer; and

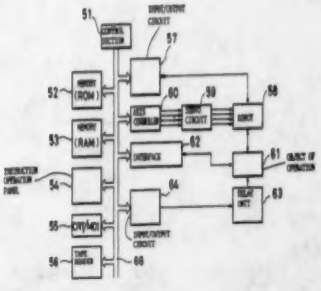
means for outputting the output signal from the processing nodes of the second layer.

4,979,127

METHOD FOR AUTOMATICALLY SETTING A TOOL TIP POINT

Toru Mizuno, Tama; Ryuichi Hara, and Hiroji Nishi, both of Yamanashi, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP88/00885, § 371 Date Mar. 27, 1988, § 102(e) Date Mar. 27, 1988, PCT Pub. No. WO89/02349, PCT Pub. Date Mar. 23, 1989
PCT Filed Sep. 2, 1988, Ser. No. 335,539
Claims priority, application Japan, Sep. 16, 1987, 62-229820
Int. Cl.[5] G05B *19/415*
U.S. Cl. 364—513 8 Claims



1. A method for automatically setting a tip point of a tool, comprising the steps of:

(a) causing a robot, having an aim with a faceplate containing a center, to assume at least four postures while maintaining the tip point of the tool on a fixed point within a space occupied by said robot and instructing said robot of coordinate positions of the center point of the faceplate of said robot, using a base coordinate system set in the space occupied by said robot, corresponding to the at least four postures;

(b) calculating coordinates of a center of curvature of a spherical surface passing approximately through the coordinate positions instructed in step (a) for the center point of the faceplate in dependence upon the coordinate positions; and

(c) determining and setting a coordinate position of the tip point, in a faceplate coordinate system for the faceplate, in dependence upon posture vectors of the tool, the coordinates of the center of curvature of the spherical surface calculated in step (b), and at least one of the coordinate positions of the center point of the faceplate given for instruction in step (a).

4,979,128

METHOD OF DECIDING ROBOT LAYOUT

Masaki Seki, Tokyo, and Haruhiko Tatsumi, Kanagawa, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

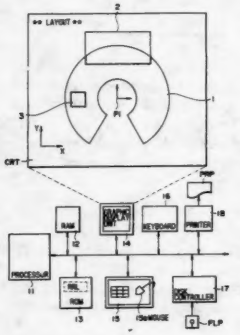
PCT No. PCT/JP88/00650, § 371 Date Feb. 8, 1989, § 102(e) Date Feb. 8, 1989, PCT Pub. No. WO89/00094, PCT Pub. Date Jan. 12, 1989

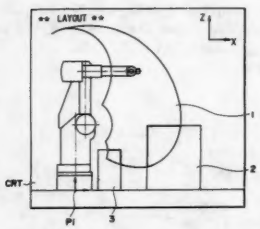
PCT Filed Jun. 29, 1988, Ser. No. 309,663

Claims priority, application Japan, Jun. 29, 1987, 62-161987

Int. Cl.[5] G05B *19/42*

U.S. Cl. 364—513 **10 Claims**





1. A method for deciding a robot layout based upon investigating interference between the robot and obstacles, comprising:

(a) inputting robot axis configuration data, data contour data indicative of the contours of the obstacles and layout data of the obstacles;

(b) displaying on a display screen, the obstacles based on said contour data and said layout data;

(c) inputting an origin of robot layout and a designated height from a reference plane;

(d) determining display data for displaying a maximum range of robot motion using said designated height, said origin of robot layout and said data indicative of maximum range of movements along each robot axis;

(e) displaying said maximum range of motion using said display data;

(f) displaying obstacles within said maximum range of motion in color different from that of obstacles outside said maximum range of motion; and

(g) changing said origin of robot layout to eliminate interference between the robot and the obstacles.

4,979,129

DIGITAL COLOR CONVERTING APPARATUS FOR COLOR IMAGE PROCESSOR

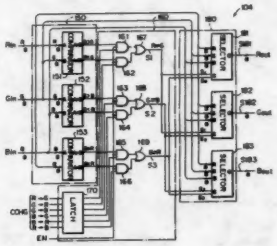
Hiromi Okubo, Tokyo; Takanori Itoh, Yokohama, and Kazuo Murai, Tokyo, all of Japan, assignors to Ricoh Company, Japan

Filed Feb. 8, 1988, Ser. No. 153,726

Claims priority, application Japan, Feb. 9, 1987, 62-27882; Feb. 9, 1987, 62-27883

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—518 **24 Claims**



1. A digital color converting apparatus comprising:

color discriminating means for determining a relationship in magnitude between at least two input image signals, wherein each input image signal is associated with a respective one of a plurality of basic separated colors and each output signal is a multi-level signal represented by a plurality of bits;

color specifying means for producing electric signals which are individually associated with an original color to be changed and an alternative color each being associated with any of said basic colors;

signal selecting means for selectively applying at least a part of said input image signals to a plurality of signal output terminals, wherein each of said signal output terminals is associated with a respective one of said basic colors; and

control means for controlling said signal selecting means in response to said electric signals outputted by said color specifying means and an electric signal outputted by said color discriminating means.

4,979,130

METHOD OF CREATING HOLLOW MULTISTROKE CHARACTERS

Hsun-Feng Li, and Yih-Trong Hsieh, both of Taiwan, Taiwan, assignors to Industrial Technology Research Institute, Taiwan

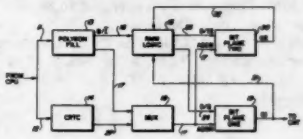
Continuation of Ser. No. 109,908, Oct. 19, 1987, abandoned. This application May 2, 1990, Ser. No. 519,260

Int. Cl.[5] G06F *15/62*

U.S. Cl. 364—518 **6 Claims**

1. The method of graphically generating hollow multistroke characters with overlaying strokes having borders and interiors, comprising the steps of creating first and second bit maps depicting, respectively, the border and the interior of a first stroke, modifying said bit maps so that the second bit map depicts the interiors of the first stroke and a second stroke and said first bit map depicts the borders of said first stroke and a

second stroke but does not depict any portions of the borders having addresses corresponding to addresses with interior



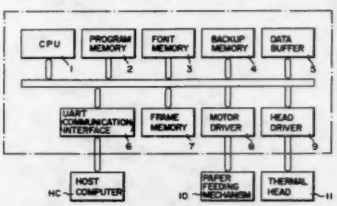
depiction on said second bit map, and displaying the image represented by the modified first bit map.

4,979,131

PRINTER APPARATUS

Michio Suzuki, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed May 4, 1990, Ser. No. 518,968
Claims priority, application Japan, May 12, 1989, 1-119522
Int. Cl.[5] G06K *15/00*
U.S. Cl. 364—519 **6 Claims**



1. A printer apparatus, comprising:

a frame memory for storing a printing pattern;

a printing head driven in accordance with the printing pattern stored in the frame memory; and

processing means for producing a plurality of graphic patterns in the frame memory in accordance with a plurality of items of printing data which are externally supplied, to thereby form a printing pattern, wherein said processing means includes a distribution data memory for storing image distribution data indicating a frame memory area which is occupied by an image portion of a graphic pattern corresponding to printing data to be changed and from which marginal portions of the graphic pattern are excluded, and area-releasing means, responsive to the supply of printing data which should be used in place of the printing data to be changed, for reading image distribution data relating to the printing data to be changed out of the distribution data memory and for clearing the frame memory area specified by the image distribution data.

4,979,132

CONTROL DEVICE FOR USE WITH AN IMAGE RECORDING SYSTEM

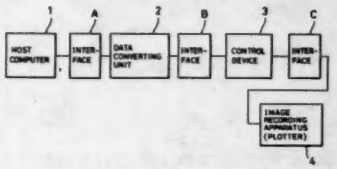
Junichi Sugimoto, Iwatsuki, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,206
Claims priority, application Japan, Jun. 24, 1988, 63-156265
Int. Cl.[5] G06K *15/00*
U.S. Cl. 364—520 **5 Claims**

1. A control device for use with an image recording system, said image recording system including a host computer for generating graphic data of a unit set of drawings and a data converting unit for converting the graphic data of the set of drawings into raster image data, the control device controlling outputting of the graphic data of the unit set of drawings converted into the raster image data to an image recording apparatus, said control device comprising:

image storing means for temporarily storing the image data of the unit set of drawings;

input control means for transmitting the image data of the unit set of drawings transmitted from the data converting unit to the image recording apparatus and after detecting both an output completion information of the graphic data of the unit set of drawings transmitted from the host computer and malfunction information of the image recording



apparatus, informing the host computer of the malfunction of the image recording apparatus; and

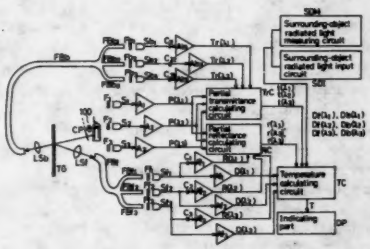
output control means for detecting the malfunction of the image recording apparatus and informing the input control means of the detected malfunction and after detecting both the output completion information of the graphic data of the unit set of drawings transmitted from the host computer via the input control means and a normality of the image recording apparatus, transmitting the image data of the unit set of drawings stored in the image storing means to the image recording apparatus.

4,979,133

PYROMETER

Jiro Arima, and Hiroji Tsujimura, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 8, 1989, Ser. No. 308,432
Claims priority, application Japan, Feb. 8, 1988, 63-27299
Int. Cl.[5] G01J *5/00*
U.S. Cl. 364—557 **12 Claims**



3. Pyrometer comprising:

(a) light emitting means for emitting reference light having at least three wavelengths to said target to be measured;

(b) first light measuring means for measuring the intensity of the reference light emitted by said light emitting means with respect to said at least three wavelengths to produce first signals;

(c) second light measuring means for measuring the intensity of light reflected by said target with respect to said at least three wavelengths to produce second signals;

(d) third light measuring means for measuring the intensity of light transmitted through said target with respect to said at least three wavelengths to produce third signals;

(e) fourth light measuring means for measuring the intensity of light radiated by said target with respect to said at least three wavelengths to produce fourth signals; and,

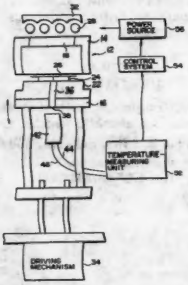
(f) calculating means for calculating a temperature of said target on the basis of a reference light measured value, a reflected light measured value, a transmitted light measured value and a radiated light measured value according to the first, second, third and fourth signals respectively with respect to each of said at least three wavelengths.

4,979,134

METHOD FOR MEASURING SURFACE TEMPERATURE OF SEMICONDUCTOR WAFER SUBSTRATE, AND HEAT-TREATING APPARATUS

Jiro Arima; Hiroji Tsujimura, both of Osaka; Tomonori Narita, Tokyo, and Hiroki Takebuchi, Kawasaki, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka and Tokyo Electron Limited, Tokyo, both of, Japan

Filed Jul. 14, 1989, Ser. No. 380,026
Claims priority, application Japan, Jul. 15, 1988, 63-176343
Int. Cl.[5] G01J 5/00
U.S. Cl. 364—557 13 Claims



6. An apparatus for heat-treating a semiconductor wafer substrate, comprising:

means for heating the wafer substrate;

means for intermittently emitting infrared rayincluding reference light toward the wafer substrate;

means for selectively detecting infrared rays of a plurality of kinds whose wavelengths are differ from each other, among the infrared rays included in the reference light;

means for detecting infrared rays having the same wavelengths as those of the selectively detected infrared rays, among the infrared rays included in the reference light reflected by the wafer substrate and the infrared rays radiated by the wafer substrate itself;

means for discriminating the infrared rays included in the reference light reflected by the wafer substrate from the infrared rays radiated by the wafer substrate itself;

means for calculating the surface temperature of the wafer substrate on the basis of the selectively detected infrared rays, the discriminated infrared rays included in the reflected reference light, and the discriminated infrared rays radiated by the wafer substrate; and

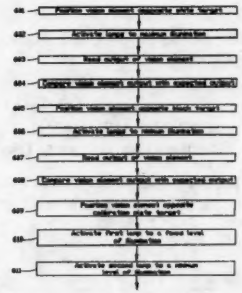
means for controlling the heating means on the basis of the calculated surface temperature.

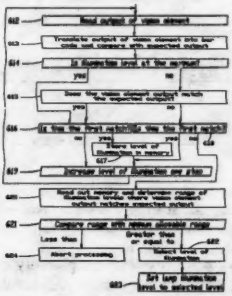
4,979,135

VISION SYSTEM ILLUMINATION CALIBRATION APPARATUS

Michael E. Moy, Lafayette, Colo., assignor to Storage Technology Corporation, Louisville, Colo.

Continuation of Ser. No. 148,616, Jan. 27, 1988, abandoned. This application Sep. 25, 1989, Ser. No. 412,170
Int. Cl.[5] G05B 19/42; G08C 21/00; G01J 1/32; G06F 15/20
U.S. Cl. 364—571.01 29 Claims





29. In a self-calibrating object handling system which includes a vision element for reading machine-readable data imprinted on said objects and a source of illumination that is operable at any one of a plurality of predefined levels which levels are sequentially ordered from a first to a last a method of automatically adjusting the level of illumination provided by said source of illumination as a function of the distinguishability of said machine-readable data read by said vision element comprising:

calibration target means having a set of machine-readable data imprinted thereon;

means for positioning said vision element opposite said calibration target means set of machine-readable data;

means for storing a set of data representative of a fixed number of levels of illumination between a minimum level of illumination and a maximum level of illumination;

means for sequentially reading out said stored set of data in order of increasing level of illumination;

means responsive to said reading out means for activating said source of illumination to produce a level of illumination representative of said data read out of said storing means;

means for producing a matrix of data points, each data point corresponding to the level of illumination of a corresponding point on said calibration target, said matrix being inclusive of said set of machine-readable data imprinted on said calibration target means;

means for storing a set of data representative of said set of machine-readable data imprinted on said calibration target means;

means responsive to said activating means for comparing said matrix of data points produced by said vision element at each level of illumination with said stored set of data;

means responsive to said comparing means for identifying said level of illumination that said comparing means first consistently determines that said produced matrix of data points match said stored set of data;

means responsive to said identifying means for computing the average of said identified level of illumination and said maximum level of illumination;

means responsive to said computing means for setting said source of illumination to operate at the level of illumination closest to said average as said set level of illumination; and

means responsive to said comparing means for disabling said setting means if said comparing means fails to match said produced matrix of data points with said stored set of data for greater than a predetermined number of sequential levels of illumination.

4,979,136

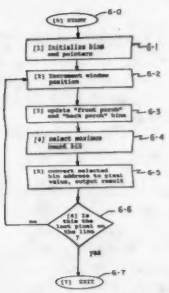
PROCESSING SYSTEM AND METHOD FOR ENHANCING IMAGE DATA

Carl F. R. Weiman, Westport, and William Pong, Brookfield Center, both of Conn., assignors to Transitions Research Corporation, Danbury, Conn.

Filed Mar. 1, 1988, Ser. No. 162,752

Int. Cl.[5] G06F *15/20, 15/353*

U.S. Cl. 364—572 **34 Claims**



1. In a method for processing a sequence of data elements each having a parameter value, the totality of such values being within a pre-determined range of values, the steps comprising

(a) defining a pre-determined set of classes of parameter values, where each class corresponds to a sub-range of said range of parameter values, and where each parameter value lies within a respective sub-range corresponding to one such class,

(b) for each individual data element of said sequence, selecting a pre-determined multiplicity of neighboring data elements,

(c) determining the sub-range for the parameter value of said individual data element and for the parameter value of each of said neighboring elements and increasing a count corresponding to the respective pre-determined class associated with that determined sub-range,

(d) selecting without regard to rank order of parameter value a single one of said classes whose count is not exceeded by the count of any other class, and

(e) replacing the parameter value of said individual element with a replacement value characteristic of said selected parameter value class.

4,979,137

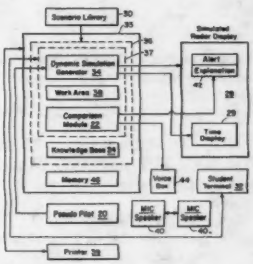
AIR TRAFFIC CONTROL TRAINING SYSTEM

Arthur Gerstenfeld, Newton; Michael N. Gualtieri, Boxford, and Thomas D. Moody, Reading, all of Mass., assignors to UFA Inc. Mass

Continuation-in-part of Ser. No. 931,867, Nov. 18, 1986, Pat. No. 4,827,418. This application Apr. 1, 1988, Ser. No. 176,639

Int. Cl.[5] G06F *15/48*

U.S. Cl. 364—578 **43 Claims**



1. A traffic control training system for interacting with a user, comprising:

means for generating a representation of at least one moving vehicle having an initial position and heading for producing a dynamic simulation of a traffic scenario;

means for entering a controller command from the user for altering the traffic scenario simulation;

a knowledge base for storing accepted rules and procedures applicable to the traffic scenario simulation; and

a comparison module for comparing the rules and procedures to at least one of the present state of the simulation of the traffic scenario and the controller command and for issuing an alert upon the immediate and foreseeable failure of the user to observe any rule or procedure in the knowledge base.

4,979,138

HIGH FAN FACTOR MODIFIED CROSSBAR ARCHITECTURE AND METHOD FOR OPTICAL DIGITAL COMPUTING

Raymond Arrathoon, 1409 Chestnut La., Rochester Hills, Mich. 48063

Continuation-in-part of Ser. No. 231,718, Aug. 12, 1988, which is a continuation-in-part of Ser. No. 912,353, Sep. 26, 1986, Pat. No. 4,821,222. This application Aug. 18, 1989, Ser. No. 395,734

Int. Cl.[5] G06F 7/56

U.S. Cl. 364—713 **32 Claims**

1. A hybrid optical/electronic cross connection apparatus for implementing digital logic functions, the apparatus comprising:

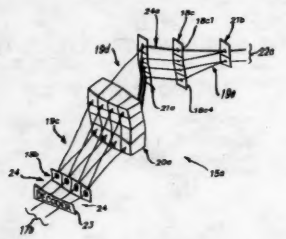
first means for converting a plurality of input bits to a greater number of first optical input signals;

a cross connection array including (1) a plurality of first detector means each being for detecting a distinct one of the first optical input signals, (2) means for electrically performing digital logic operations within the cross connection array upon detected first input signals to produce electrical output signals, and (3) a plurality of means for producing optical output signals from electrical output signals;

a plurality of second detector means each being for detecting at least one of the optical output signals from the array;

a plurality of first optical fiber interconnects for carrying the

first optical input signals to the first detector means of the cross connection array; and



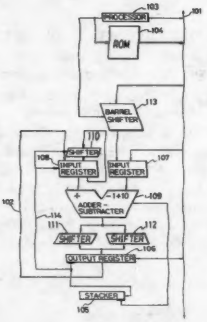
a plurality of second optical fiber interconnects for carrying the optical output signals to the plurality of third detector means.

4,979,139

ARITHMETIC UNIT FOR EXPONENTIAL FUNCTION

Misayo Nakayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,171
Claims priority, application Japan, Feb. 17, 1988, 63-35902
Int. Cl.[5] G06F 7/38, 7/52
U.S. Cl. 364—715.01 4 Claims



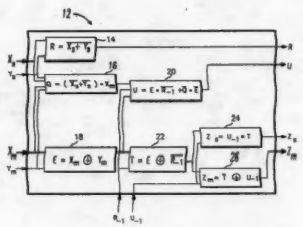
1. An arithmetic unit for carrying out sequentially arithmetic pseudo division and reverse-sequentially arithmetic pseudo multiplication according to algorithm based on *Sequential Table Lookup* method utilizing constant values $2^k \text{xloge}(1+2^{-k})$ so as to calculate value of exponential function e^x-1 for a given value x, the unit comprising: generating means for sequentially generating the constant values $2^k \text{xloge}(1+2^{-k})$ from $k=0$ to $k=m-1$ where m is an positive integer number; an adder-subtracter controllable to selectively carry out arithmetic addition and subtraction; an output register connected to receive and store the arithmetic result from the adder-subtracter; a barrel shifter operative during the pseudo multiplication and connected to the output register for right-shifting a content thereof by shift bit count k where $k=1, 2 \ldots, m-2, m-1, m$; a pair of input registers connected to the adder-subtracter for inputting thereinto their contents to be processed thereby, one of the input registers being connected to the output register for receiving therefrom an updated content thereof, the other input register being connected to the generating means for receiving therefrom the constant value $2^k \text{xloge}(1+2^{-k})$ during the pseudo division and to the barrel shifter for receiving therefrom the right-shifted content of the output register during the pseudo multiplication; and stack means connected to the output register for stacking in First-In, Last-Out basis sign bit of the content of the output register, the stack means being operative during the sequential arithmetic pseudo division for controlling the adder-subtracter according to the value of sign bit to carry out the subtraction of the content of the other input register from the content of said one input register, and being operative during the sequential arithmetic pseudo multiplication for controlling the adder-subtracter according to the value of sign bit to selectively carry out the addition of a value zero or the content of the other input register to the content of said one input register.

4,979,140

SIGNED DIGIT ADDER CIRCUIT

Henry M. Darley, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 175,967, Mar. 31, 1988, Pat. No. 4,890,127. This application Jul. 27, 1989, Ser. No. 386,825
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.
Int. Cl.[5] G06F 7/50
U.S. Cl. 364—786 8 Claims



1. High-speed numerical processor having a plurality of cells for adding two signed digit addends, X and Y, each addend having a plurality of digits, each digit representable by logical sign portions, X_s and Y_s, and logical magnitude portions, X_m and Y_m, each said cell comprising:

TI—13244.1 (1)

a first circuit for generating a first logical output for each digit of the respective addends from the sign portions of the respective addends;

a second circuit for generating a first intermediate logical value for each digit of the respective addends from the sign and magnitude portions of the respective addends;

a third circuit for generating a second intermediate logical value for each digit of the respective addends from the magnitude portions of the respective addends; and

an output circuit receiving as inputs said first intermediate logical value, said second intermediate logical value and a pair of signal outputs from a preceding one of said cells and outputting at least a sum signal representing a sum of corresponding ones of said digits of said addends.

4,979,141

TECHNIQUE FOR PROVIDING A SIGN/MAGNITUDE SUBTRACTION OPERATION IN A FLOATING POINT COMPUTATION UNIT

Robert G. Gelinas, Westboro, and Thomas V. Radogna, Framingham, both of Mass., assignors to Data General Corporation, Westboro, Mass.

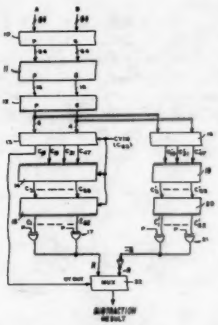
Filed Sep. 28, 1988, Ser. No. 250,418
Int. Cl.[5] G06F 7/50
U.S. Cl. 364—787 5 Claims

1. A system for providing a sign/ magnitude subtraction operation for a first operand A and a second operand B, said system comprising

propagate-generate means comprising a plurality of propagate-generate computation stages responsive to said first and second operands for producing intermediate propagate and generate outputs and final propagate and generate outputs, a first one of said stages producing an intermediate propagate output;

a first carry computation means responsive to said final propagate and generate outputs and to a carry-in bit for producing final carry outputs and a carry-out bit;

means responsive to said final carry outputs and to a selected



intermediate propagate output for producing a first subtraction result (A−B);

a second carry computation means responsive to the same said final propagate and generate outputs for producing second final carry outputs;

means responsive to said second final carry outputs and to said selected intermediate propagate outputs for producing a second subtraction result (B−A); and

means responsive to said carry out bit for selecting one of said first or second subtraction results as the subtraction result of said sign/magnitude subtraction operation.

4,979,142

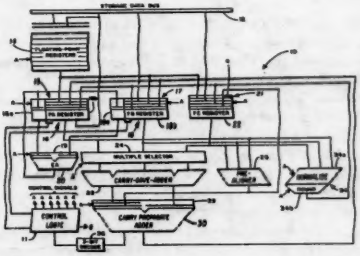
TWO-BIT FLOATING POINT DIVIDE CIRCUIT WITH SINGLE CARRY-SAVE ADDER

Richard G. Allen, and Donald L. Freerksen, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,261

Int. Cl.[5] G06F 7/52

U.S. Cl. 364—767 18 Claims



1. An apparatus for performing a 2-bit, non-restoring floating point divide operation in a series of iterations, comprising

(a) a divisor register for holding the divisor of said divide operation;

(b) a dividend register for holding the dividend of said divide operation and subsequent partial dividends during respective iterations;

(c) a quotient register for holding partial quotients during respective iterations and the quotient result;

(d) an adder circuit having three inputs for receiving operands, one of said inputs being coupled to said dividend register;

(e) a multiple selector circuit having respective outputs connected to the remaining two inputs of said adder circuit, and having inputs connected to said divisor register, and having means for selectively gating multiples of said divisor into said adder circuit, controllable by activation signals; and

(f) a control logic circuit having means for sensing the three most significant divisor register bits and the three most significant dividend register bits, and having means for generating said activation signals in response thereto, to selectively gate certain multiples of said divisor into said adder circuit; said control logic circuit further comprising means for selecting predetermined divisor multiples for each iteration of said divide operation as a function of the true/complement value and the most significant three bits of the respective divisor and partial dividends according to the following tabulation:

TRUE DIVIDEND	DIVISOR 100	101	110	111
000	0	0	0	0
001	0	0	0	0
010	1/4	1/4	1/4	1/4
011	1/4	1/4	1/4	1/4
100	1	1	3/4	3/4
101	1	1	3/4	3/4
110	3/2	1	1	1
111	3/2	3/2	1	1

COMPLEMENT DIVIDEND	DIVISOR 100	101	110	111
000	3/2	3/2	1	1
001	3/2	1	1	1
010	1	1	1	3/4
011	1	1	3/4	3/4
100	1/4	1/4	1/4	1/4
101	1/4	1/4	1/4	1/4
110	0	0	0	0
111	0	0	0	0;

and control logic circuit also having means for formulating partial quotients as a function of the dividend register contents before and after each of said iterations and the divisor multiples selected for said iteration.

4,979,143

RECOVERY FROM POWER-DOWN MODE

Osamu Takano; Hiroshi Kawakami, both of Tokyo, and Masahiko Yakuwa, Wako, all of Japan, assignors to Oki Electric Industry Co., Ltd. and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Jul. 6, 1988, Ser. No. 215,622

Claims priority, application Japan, Jul. 9, 1987, 62-172673

Int. Cl.[5] G06F 12/16

U.S. Cl. 364—900 30 Claims

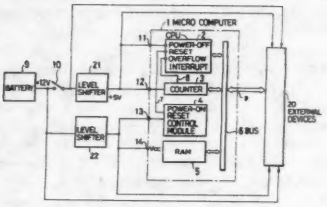
1. A control system for use with a power source that is subject to failure or disconnection, said control system comprising:

main power means, normally connected to the power source, for providing a switchable main power supply;

back-up power means, normally connected to the power source, for continuously providing a back-up power supply as long as the power source remains operative and remains connected to the back-up power means;

external devices which are connected to at least the main power means; and

a microcomputer having a CPU and a volatile memory, the microcomputer being powered by the back-up power supply and being operable, when the main power supply is switched on, in a normal mode in which the CPU executes a main routine for monitoring and controlling the external devices and updating data in the volatile memory, the microcomputer additionally being operable, when the main power supply is switched off, in a power-down



mode in which the CPU halts and data in the volatile memory is maintained,

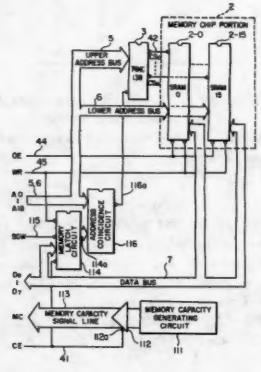
wherein the microcomputer additionally includes interrupt means, connected to the main power means, for causing an interrupt if the main power supply is switched from the off-state to the on-state, the microcomputer resuming execution of the main routine in the normal operating mode after the interrupt.

4,979,144

IC MEMORY CARD HAVING START ADDRESS LATCH AND MEMORY CAPACITY OUTPUT MEANS

Masaharu Mizuta, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 14, 1988, Ser. No. 284,714
Claims priority, application Japan, Jun. 20, 1988, 63-150153
Int. Cl.[5] G06F *12/02*
U.S. Cl. 364—900 **10 Claims**



1. An IC memory card incorporating an IC memory chip portion, comprising:

a data bus,

an address bus having a plurality of upper address bits,

memory means for storing data connected to said address bus and said data bus,

means for storing a start address received over said data bus from outside of said card and having upper bits corresponding to the upper address bit of said address bus,

means for storing the capacity of said memory means and for transmitting signal representing the memory capacity outside of said card, and

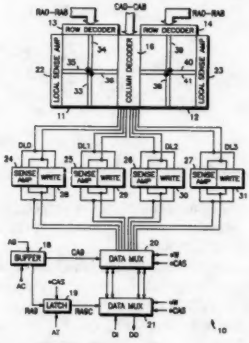
means connected for receiving the stored start address and for receiving from said address bus a receive address having upper bits corresponding to the upper address bits of said address bus for comparing the start address with the receive address and for making the data in said memory means accessible from outside of said card when the upper bits of the start address and the receive address are identical to each other, whereby a desired start address can be set from outside of said card.

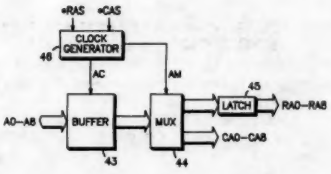
4,979,145

STRUCTURE AND METHOD FOR IMPROVING HIGH SPEED DATA RATE IN A DRAM

Scott Remington, and William L. Martino, Jr., both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 1, 1986, Ser. No. 858,326
Int. Cl.[5] G06F *12/06*
U.S. Cl. 364—900 **19 Claims**





1. A read/write memory having a set of memory cells in which a memory cell is selected by a first plurality of address signals, a second plurality of address signals, and a control address signal, comprising:

first decoder means for selecting a first subset of memory cells from said set of memory cells in response to the first plurality of address signals;

second decoder means, coupled to the first decoder means, for selecting a first memory cell and a second memory cell from the first subset of memory cells in response to the second plurality of address signals;

third decoder means, coupled to the second decoder means for selecting between the first memory cell and the second memory cell in response to an internal address signal; and

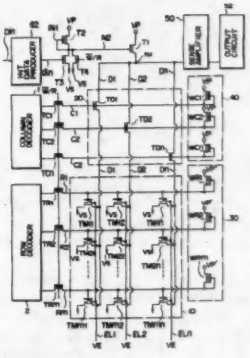
control means, coupled to the third decoder means, for providing the internal address signal at a logic state which is the same as a logic state of the control address signal when an array toggle signal is in a first logic state and for providing the internal address signal at a logic state which

is opposite that of the control address signal when the array toggle signal is in a second logic state.

4,979,146
ELECTRICALLY ERASABLE NON-VOLATILE SEMICONDUCTOR DEVICE

Sadayuki Yokoyama, Kawasaki; Masamichi Asano, Tokyo; Hiroshi Iwahashi, Yokohama, and Kaoru Nakagawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 27, 1989, Ser. No. 302,712
Claims priority, application Japan, Jan. 28, 1988, 63-18264
Int. Cl.[5] G11C *11/34*; H01L *23/48*
U.S. Cl. 365—185 **10 Claims**



1. A non-volatile semiconductor memory device comprising:

a row decoder;

a column decoder;

a plurality of row lines;

a plurality of column lines;

a plurality of column selection lines selected by said column decoder, said column selection lines being coupled to said column lines in such a way that a selected column selection line selects the corresponding column line;

a memory cell array including a plurality of non-volatile semiconductor memory cells connected between said row lines and said column lines in a matrix array, each of the memory cells including a floating gate, electrons being excessively discharged from the floating gate so that the floating gate is positively charged when data is erased from the cell in an erasing mode;

means for applying a first voltage having a first voltage level to the column selection lines in a data writing mode; and

means for applying a second voltage having a second voltage level to the row lines in a data writing mode, the second voltage level being lower than the first voltage level.

4,979,147
ELECTRONIC DEVICE WITH KEY SWITCH

Hiroshi Ushiki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

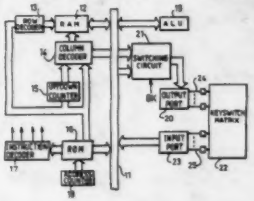
Continuation of Ser. No. 93,787, Sep. 8, 1987, abandoned. This application Aug. 23, 1989, Ser. No. 397,331
Claims priority, application Japan, Sep. 29, 1986, 61-227981
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—189.04 **4 Claims**

1. An electronic data input device for temporary storage of the input data in a random memory, the device including memory means for storing predetermined data, comprising:

keyswitch means for entry of data;

input port means for receiving the entered data from the keyswitch means;

output port means coupled to the keyswitch means for temporary storage of the predetermined data from the memory means and transfer of the predetermined data to the keyswitch means; and

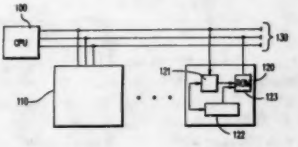


means for simultaneously transferring the predetermined data from the memory means to the output port means and the entered data from the input port means to the random memory.

4,979,148
INCREASING OPTIONS IN MAPPING ROM IN COMPUTER MEMORY SPACE

Gregory F. Bush, Endicott, N.Y.; Don S. Keener, Boca Raton, Fla.; Jeanne E. Morel, Boca Raton, Fla., and Richard W. Voorhees, Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 9, 1988, Ser. No. 281,612
Int. Cl.[5] G06F *12/00*; G11C *8/00*, *15/00*
U.S. Cl. 365—230.01 **6 Claims**



1. A device comprising a component of a personal computer system, said component including read only memory;

said read only memory including two addressable fields,

a first addressable field storing read only instruction codes for said component in a given sequential order, said given sequential order comprising a first group of instruction codes followed by a second group of instruction codes, and

a second addressable field storing identical instruction codes in a different order, said different order comprising said second group of instruction codes followed by said first group of instruction codes.

4,979,149

NON-VOLATILE MEMORY DEVICE INCLUDING A MICRO-MECHANICAL STORAGE ELEMENT

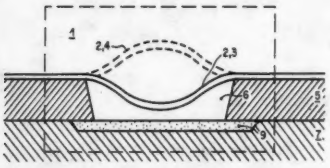
Radivoje Popovic; Katalin Solt, and Heinz Lienhard, all of Zug, Switzerland, assignors to LGZ Landis & Gyr Zug AG, Zug, Switzerland

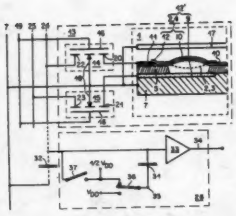
Continuation of Ser. No. 95,053, Sep. 9, 1987, abandoned. This application Oct. 5, 1989, Ser. No. 417,338

Claims priority, application Switzerland, Sep. 10, 1986, 03647/86

Int. Cl.[5] G11C *23/00*

U.S. Cl. 365—244 **10 Claims**





1. A memory device for storing digital electronic signals comprising

at least one micromechanical memory element, said memory element comprising a support having a recess defined therein, and a curved mechanical component bridging said recess and having first and second stable positions corresponding to first and second digital logic values, said first stable position being concave down towards said support and said second stable position being convex up away from said support,

a conductive barrier layer located on a surface of said support under said mechanical component,

writing means for creating an attractive force between said mechanical component and said barrier layer to cause said mechanical component to occupy said first stable position and for creating a repulsive force between said mechanical component and said barrier layer to cause said mechanical component to occupy said second stable position, and

electronic reading circuitry including a field effect transistor coupled to said micromechanical memory element for electronically detecting the one of said first and second stable positions that said mechanical component is in, and for producing an electronic output signal indicative thereof and corresponding to one of said digital logic values.

4,979,150

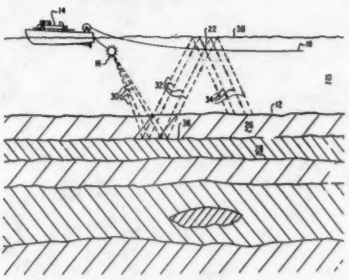
SYSTEM FOR ATTENUATION OF WATER-COLUMN REVERBERATIONS

Frederick J. Barr, Houston, Tex., assignor to Halliburton Geophysical Services, Inc., Houston, Tex.

Filed Aug. 25, 1989, Ser. No. 398,809

Int. Cl.[5] G01V *1/38*

U.S. Cl. 367—24 **40 Claims**



1. An improved seismic reflection method for geophysical prospecting in water covered areas, comprising the steps of

A. generating a seismic wave for reflection from earth strata,

B. detecting water pressure at a first position in the water resulting from said seismic wave and generating a signal representative thereof,

C. detecting water velocity at a position substantially near said first position resulting from said seismic wave and generating a signal representative thereof, and

D. generating an enhanced seismic reflection signal by multiplying at least one of said water pressure-representative signal and the water velocity-representative signal by a scale factor dependent upon an acoustical impedance of a substance through which said seismic wave travels, and by summing said scaled water velocity-representative and water pressure-representative signals, and enhanced seismic reflection signal being substantially free of at least downwardly-propagating components of reverberation of said seismic wave within the water.

4,979,151

METHOD AND APPARATUS FOR INVESTIGATING STAND-OFF IN A BOREHOLE

Michael P. Ekstrom, 264 Umpawaug Rd., Redding, Conn. 06875, and R. Mark Havira, 66 Gillotti Rd., New Fairfield, Conn. 06810

Continuation of Ser. No. 316,224, Mar. 24, 1982. This application Jun. 15, 1987, Ser. No. 62,787

The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.

Int. Cl.[5] G01V *1/00*

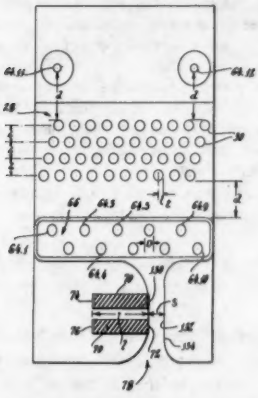
U.S. Cl. 367—35 **19 Claims**

1. A method for ultrasonically investigating an earth form formation penetrated by a borehole along whose axis a tool, having a plurality of ultrasonic acoustic transducers, is moved, comprising the steps of:

pressing a laterally-spread array of ultrasonic acoustic transducers mounted on a common pad against a circumferential segment of the wall of said borehole, and while so pressed, moving said array of acoustic transducers along the axis of the borehole;

activating the ultrasonic acoustic transducers and directing ultrasonic pulses therefrom towards the earth formation with individual field patterns having spatial resolutions that are sufficiently high so as to stimulate detectable acoustic reflections attributable to borehole regions defined by said field patterns and arising from small borehole wall surface irregularities such as fractures, small caves, and boundaries between thin beds; and

detecting with said respective individual acoustic transducers acoustic reflections stimulated by said ultrasonic pulses from activated acoustic transducers in said array and



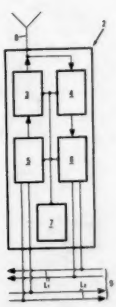
returned from the borehole wall and generating signals representative of the amplitude or energy content of said acoustic reflections from said borehole regions in said circumferential segment.

4,979,152

DEVICE FOR TRANSMITTING SIGNALS BY RADIO AND CABLE BETWEEN A CENTRAL CONTROL AND RECORDING SYSTEM AND DATA ACQUISITION DEVICES

Joseph Rialan, Meudon, and Gérard Thierry, Paris, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Continuation-in-part of Ser. No. 411,133, Aug. 24, 1982, Pat. No. 4,583,206. This application Dec. 22, 1983, Ser. No. 564,392
Claims priority, application France, Dec. 22, 1982, 82 21730
Int. Cl.[5] G01V *1/22*
U.S. Cl. 367—77 **14 Claims**



1. A device for bi-directional transmission of signals between a central control and recording system and a plurality of acquisition devices over areas including locations from which reliable direct radio transmission to the central control and recording system is impossible, each of said acquisition devices including means for collecting signals originating from a seismic sensor or a set of seismic sensors and means for digitizing and storing said sensor signals so that said stored signals may be transmitted to said central control and recording system upon receipt of control signals from the central control and recording system, said central control and recording system including means for receiving and recording the seismic signals collected by said acquisition devices, each of said acquisition devices and said central control and recording system being equipped with transmission means for two-way transmission of data by radio or by transmission cable; said bi-directional transmission device comprising:

a transmission cable; and

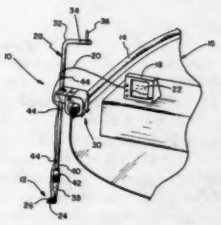
a relay element which is equipped with a radio transmitter-receiver set and means connected to said radio transmitter-receiver set and said transmission cable for transmitting signals received via said transmitter-receiver set on said transmission cable and for supplying to said transmitter-receiver set signals received on said transmission cable for transmission by radio link, said relay element being connected via said transmission cable either to those particular acquisition devices of said plurality of acquisition devices which are at locations from which direct radio transmission to said central control and recording system is impossible or to the central control and recording system and being disposed at a location near a boundary of an area where reliable direct radio transmission between said central control and recording system and said particular acquisition devices cannot be established, whereby bi-directional exchanges of signals between said central control and recording system and said particular acquisition devices are conducted by using both said transmission cable and a radio link via said radio transmitter-receiver set in said relay element.

4,979,153

MOUNTING APPARATUS FOR THE SONIC TRANSDUCER OF A FISH-FINDER

Cecil M. Terry, 1905 Berkley Ave., Fort Wayne, Ind. 46815

Filed Aug. 7, 1989, Ser. No. 389,954
Int. Cl.[5] G08B *21/00*; A01K *79/02*
U.S. Cl. 367—93 **15 Claims**



1. In a sonic fish-finder system used by a fisherman to detect the presence of fish in water about a boat, including a transducer for transmitting and receiving a directional sonic signal, a mounting apparatus for mounting the transducer to the boat, comprising:

an elongate control arm including a hollow tubular member having an upper control end and a lower transducer-mounting end;

clamp means for connecting said control arm to the boat such that said transducer-mounting end is disposed in the water;

a movable mounting member connected to said transducer-mounting end, the transducer being mountable to said mounting member;

control input means, associated with said control end and actuable by the fisherman, for selecting a desired direction for the directional sonic signal of the transducer, said control input means including a control lever pivotally mounted to said control end of said control arm and pivotally movable by the fisherman to a desired angular position for selecting the direction of the sonic signal, said control lever being interconnected with said mounting member for pivotally moving said mounting member

about a generally horizontal axis in response to pivotal movement of said control lever;

control cable means extending through said hollow tubular member for interconnecting said control lever with said mounting member; and

control output means, responsive to said control input means, for moving said mounting member such that the sonic signal of the transducer is directed in said desired direction, said control input means and said control output means being capable of directing the sonic signal in a locus of directions representing semispherical coverage of the water beneath the boat, whereby the fisherman can use a fish-finder system having a directional sonic transducer to selectively scan the water about the boat.

4,979,154

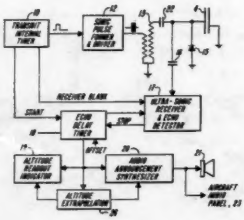
LANDING AID FOR AIRCRAFT

Lester Brodeur, 135 Bush Hill Rd., Hudson, N.H. 03051

Filed Jan. 10, 1989, Ser. No. 296,509

Int. Cl.[5] G01S *15/00*

U.S. Cl. 367—116 **12 Claims**



1. Apparatus for assisting in the landing of an aircraft by measuring the eight of an aircraft above its intended landing surface and annunciating height, comprising:

means for transmitting ultrasonic pulses directed downward from the aircraft so as to be reflected by the surface over which the aircraft is moving;

timing means for measuring the altitude of said aircraft in terms of the round trip echo delay from said surface; and,

means for verbally announcing the measured altitude of said aircraft above said surface in human speech at predetermined times corresponding to the passage of said aircraft through predetermined altitudes.

4,979,155

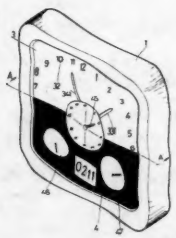
STRUCTURE OF CLOCK

Huang C. Tung, No. 34 Lane 17, Wei Shea Road, I-Lan, Taiwan

Filed May 3, 1990, Ser. No. 519,208

Int. Cl.[5] G04B *19/04*

U.S. Cl. 368—80 **3 Claims**



1. A clock, comprising:

a casing;

a movement mounted inside said casing at the center thereof to drive an hour shaft, a minute shaft and a seconds shaft to rotate, permitting said hour shaft and said minute shaft to rotate at half speed relative to the hour shaft and minute shaft of the conventional clock and permitting said seconds shaft to rotate at equal speed of the seconds shaft of the conventional clock;

a dial plate mounted on said casing covering over said movement, said dial plate having a center hole for the penetration therethrough of said hour shaft, said minute shaft and said seconds shaft and having figures on its upper half part for indication of hours;

an hour hand having a mounting shaft extending downward from its bottom in the middle and fastened in said hour shaft;

a minute hand having a mounting shaft extending downward from its bottom in the middle and fastened in said minute shaft;

a cover plate in half size of said dial plate having two folded edges on its two opposite, lateral sides and a seconds dial face circle at the center of its topmost edge, said circle having its upper half portion projecting upward from the topmost edge of said cover plate and its lower half portion merged into said cover plate and having a center hole for the penetration therethrough of said seconds shaft, said cover plate being mounted on said casing covering over the lower half part of said dial plate defining a space therebetween; and

a seconds hand having a mounting shaft extending downward from its bottom at one end and fastened in said seconds shaft.

4,979,156

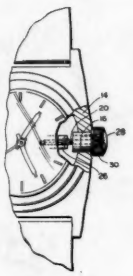
SCREW-ON WATCH STEM SEAL

Lynn C. Kester, 4208 Emil, Amarillo, Tex. 79106

Filed Jul. 27, 1989, Ser. No. 385,397

Int. Cl.[5] G04C *3/00*

U.S. Cl. 368—289 **2 Claims**



1. In combination, a watch case, a case tube rigid with the case and extending through the case, a watch stem extending into the case tube in concentrically spaced relation and including a screw threaded end portion, a crown screw threaded onto the outer end of the stem, and a screw-on seal threadedly mounted on the threaded end portion of the stem and including a peripheral seal member in sealed engagement with the interior of the case tube, said screw-on seal including a tubular internally threaded member having one end abutting the crown with the periphery positioned within the case tube, said seal member being in the form of an O-ring of resilient material engaged with the interior surface of the case tube, said tubular member having recess means in the periphery thereof receiving said O-ring to retain it mounted on the tubular member.

4,979,157

WATCH CASE PROVIDED WITH A CAP OF HARD MATERIAL

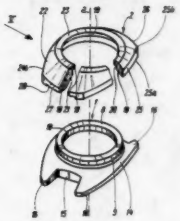
Paul Gogniat, Bienne, Switzerland, assignor to Montres Rado S.A., Lengnau, Switzerland

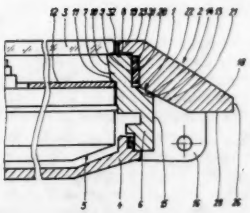
Filed Feb. 1, 1990, Ser. No. 473,310

Claims priority, application Switzerland, Feb. 14, 1989, 515/89

Int. Cl.[5] G04B 37/00

U.S. Cl. 368—276 10 Claims





1. A watch case comprising a coaxial assembly of two constituent parts, one being a middle made of a machinable material and the other being a cap made of a hard material covering the middle, wherein the middle has an upper portion limited externally by a cylindrical surface, and a lower portion limited externally by a frusto-conical surface, wherein the cap has a thicker portion internally limited by a cylindrical surface having a diameter greater than that of the middle's cylindrical surface, such as to provide a radial gap between said cylindrical surfaces, and downwards by a frusto-conical surface having the same inclination as that of the middle and which is in contact therewith, and wherein an annular fixing element made of deformable material is fitted between said cylindrical surfaces.

4,979,158

BIAS MAGNETIC FIELD ABNORMALITY DETECTING APPARATUS WHICH CONTROLS RECORDING AND ERASING OF INFORMATION

Yoshiro Yoda, Tama, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 29, 1988, Ser. No. 161,590

Claims priority, application Japan, Mar. 3, 1987, 62-048370

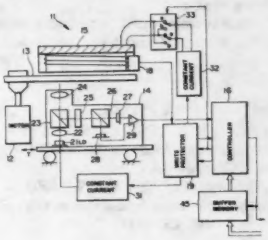
Int. Cl.[5] G11B 11/12, 13/04

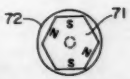
U.S. Cl. 369—013 7 Claims

1. A bias magnetic field abnormality detecting apparatus to be used in a photomagnetic recording and reproducing apparatus which records information by a laser light emitted from a laser light source onto a recording medium having a magnetic optical effect and which reproduces or erases information from said recording medium, said bias magnetic field abnormality detecting apparatus comprising:

a magnetic field generating means, provided near said recording medium, for generating a magnetic field, a direction of said magnetic field during recording information is reverse from a direction of said magnetic field erasing information;

a magnetic field abnormality sensing means for detecting whether an operating state of said magnetic field generating means is abnormal for outputting a control signal, and





said magnetic field abnormality sensing means is for detecting a size of the magnetic field including a polarity of a field magnetic coil; and

a recording and erasing prohibiting means for prohibiting recording and erasing operations of the photomagnetic recording and reproducing apparatus based on the control signal of said magnetic field abnormality sensing means.

4,979,159

METHOD OF RECORDING DATA ONTO AN OPTICAL CARD HAVING A PLURALITY OF TRACKS CONTAINING AT LEAST ONE ID SECTION, ERROR CORRECTING CODE OR DIRECTORY POINTER AREA AND METHOD OF REPRODUCING DATA THEREFROM

Yoshiaki Tsuruoka, Funabashi, and Norikazu Saitou, Fuchu, both of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

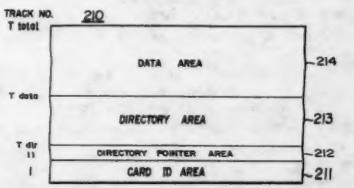
PCT No. PCT/JP88/00141, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO88/06339, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 12, 1988, Ser. No. 265,808

Claims priority, application Japan, Feb. 12, 1987, 62-30582; Feb. 12, 1987, 62-30584; Aug. 12, 1987, 62-201367

Int. Cl.[5] G11B 5/80, 7/00

U.S. Cl. 369—58 13 Claims



1. A data recording method for an optical card on which a plurality of tracks are formed, said method comprising the steps of:

defining a first guide section at an end of a track, a second

guide section at an other end of said track, an ID section between said guide sections adjacent said first guide section, an end section between said guide sections adjacent said second guide section, and a record section at an intermediate portion between said ID section and said end section;

preparing a record data to be recorded and reproduced, an ID data which contains information to identify a track, and a termination data which indicates that said record data is terminated; and

storing said record data in said record section, said ID data in said ID section, and said termination data in said end section.

4,979,160

FRONT LOADING DISK PLAYER

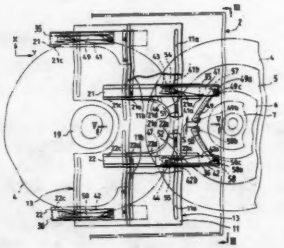
Yoshitugu Araki, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 30, 1989, Ser. No. 400,854

Claims priority, application Japan, Sep. 5, 1988, 63-116736[U]

Int. Cl.[5] G11B *33/02*

U.S. Cl. 369—75.2 **11 Claims**



1. A front loading disk player comprising:

a housing having a disk insertion opening that forms a disk insertion and ejection route;

a playing means inside said housing;

supporting means in said housing;

a pair of long carrying members supported by said supporting means in such a manner which allows movement in parallel with said insertion and ejection route between a first position close to said disk insertion opening and a second position away from said disk insertion opening, and which allows movement toward and away from each other;

driving means for moving said carrying members;

a pair of first arm members provided, respectively, on said carrying members, each having a pivot end, serving as a pivot point, and a free end;

a pair of second arm members, pivotally attached, respectively, to the free ends of said first arm members at pivot ends of said second arm members, said second arm members each having a free end; said first and second arm members being pivotably rotatable about their respective pivot ends;

bias force imparting means for imparting bias forces to said first and second arm members to bias said arm members in predetermined rotational directions, respectively;

pinching rollers provided at the respective free end parts of said first and second arm members so as to be able to pinch said disk;

sensor means positioned in said housing for detecting the pressure of a disk against said pinching rollers;

and control means responsive to said sensor means for causing said drive means to drive said carrying members apart from each other to accommodate the specific size of a disk inserted into said insertion opening and in the insertion direction to carry said disk to said playing means, when said sensors detect a predetermined disk pressure on said pinching rollers.

4,979,161

DISC-RECORD PLAYER WITH A LOADING DEVICE FOR LOADING A DISC INTO THE RECORD PLAYER

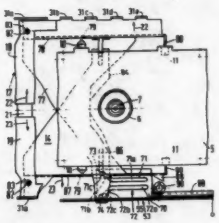
Johannes P. C. M. Verhagen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 28, 1984, Ser. No. 675,498

Claims priority, application Netherlands, Nov. 8, 1983, 8303836

Int. Cl.[5] G11B *25/04*

U.S. Cl. 369—77.2 **27 Claims**



1. A disc-record player comprising:

a housing having an opening for receiving a record disc,

a subframe resiliently supported in the housing,

a turntable carried on the subframe, and

a loading device for loading a record disc onto the turntable; comprising a transfer means, mounted to said housing, for moving in a substantially axial direction with respect to said turntable between an upper position, in which a disc can be inserted through said opening onto said transfer means, and a lower position for depositing an inserted disc onto the turntable,

characterized by comprising means for locking the subframe relative to the housing in a stable position at least prior to said transfer means reaching said lower position while the transfer means is moving to said lower position, and unlocking said subframe relative to the housing after the transfer means is moved to the lower position, so as to maintain alignment of the subframe and turntable with respect to said transfer means during loading of a disc onto the turntable, and permitting resilient movement of the turntable and subframe with respect to the housing, loading device and transfer means during playing of a disc-record.

4,979,162

APPARATUS FOR DETECTING THE SECONDARY DISTORTION OF OPTICAL TYPE RECORDED INFORMATION

Kiyoshi Kimoto, Machida, and Shinichi Tanaka, Kamakura, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 346,400, May 2, 1989, abandoned, which is a continuation of Ser. No. 142,209, Jan. 11, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 379,224

Claims priority, application Japan, Jan. 16, 1987, 62-7734; Jul. 18, 1988, 63-178478

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—116 **25 Claims**

25. A method for recording information on an optical type recording medium, comprising the steps of:

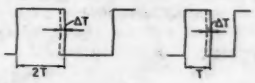
(a) alternately generating a binary signal of a first frequency and binary signal of a second frequency lower than said first frequency;

(b) applying radiation to said medium and writing the binary

signals of said first frequency and said second frequency into said medium;

(c) reproducing the binary signals of said first frequency and said second frequency written into said medium and converting them to electrical signals;

(d) AC-amplifying said electrical signals;



(e) detecting the difference between the amplitude of the output of AC amplifying means of a level higher than a reference level and the amplitude of the output of said AC amplifying means of a level lower than said reference level; and

(f) controlling the intensity of the radiation applied to said medium on the basis of the detected difference.

4,979,163

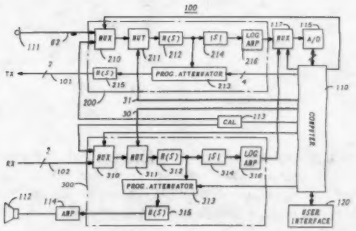
ECHO SUPPRESSION ARRANGEMENT FOR AN ADAPTIVE SPEAKERPHONE

Richard H. Erving, Red Bank; William A. Ford, Farmingdale, and Robert R. Miller, II, Convent Station, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 28, 1988, Ser. No. 298,525

Int. Cl.[5] H04M 9/08

U.S. Cl. 370—32.1 **8 Claims**



1. In a voice switching apparatus for processing speech signals on a communication line, the apparatus including means for receiving speech signals from the communication line for transmitting speech signals over the communication line, and loss insertion means for inserting loss in a transmit path for attenuating the speech signals for transmission over the communication line, an echo suppression arrangement comprising:

means for determining the type of acoustic environment in which the voice switching apparatus is employed, the determining means including means for generating a tone burst signal comprising multiple tones in said environment and means responsive to the return to each tone in the tone burst signal to said apparatus for measuring a composite impulse response of said environment;

means for measuring a receive speech signal received from the

means for measuring a transmit speech signal provided by the apparatus to the communication line for transmission over the communication line; and

loss adjusting means operably responsive in combination to the acoustic environment determining means, the transmit speech measuring means and the receive speech measuring means, the loss adjusting means including a predetermined threshold coupling level and comparison means for comparing the speech signal received from the communication line with the threshold coupling level, the loss adjusting means being operable for increasing the level of attenuation inserted by the loss insertion means into the transmit path when the level of the received speech signal exceeds that of the threshold coupling level.

4,979,164

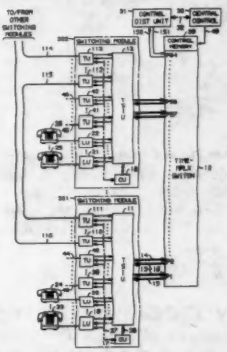
SWITCHING SYSTEM RELIABILITY

Menachem T. Ardon, Naperville, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 24, 1989, Ser. No. 356,802

Int. Cl.[5] H04M 7/14

U.S. Cl. 370—58.1 **18 Claims**



1. A telecommunication switching system comprising:

a first and second switch unit,

a central connection means connected to said first and said second switch units and cooperative therewith for selectively advancing connections there between;

a trunk connecting said first and said second switch units;

means for detecting the unavailability of said central connection means for advancing connections between said first and second switch units; and

means responsive to said detecting means for providing trunk services to said trunk following detection of said central connection means being unavailable to connect said first and second switch units.

4,979,165

MULTIPLE QUEUE BANDWIDTH RESERVATION PACKET SYSTEM

Rajiv S. Dighe, Middletown, and Carl J. May, Jr., Holmdel, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 23, 1989, Ser. No. 371,235

Int. Cl.[5] H04J 3/26

U.S. Cl. 370—60 **10 Claims**

1. Apparatus for supplying information packets as an output, comprising:

means for obtaining output information for individual arriving packets;

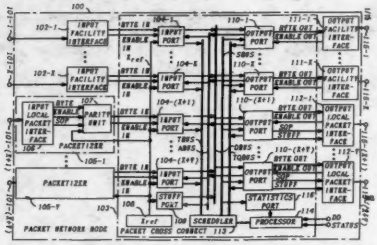
at least first queue means for storing prescribed output information for individual packets designated a first type;

at least second queue means for storing prescribed output information for individual packets designated a second type;

means responsive to prescribed output information of said arriving packets for generating a scheduled time of service for each of said arriving packets designated said second type; and

means responsive to each said scheduled time of service and

said prescribed output information stored in said at least first queue means and said at least second queue means for controllably supplying packets as an output of said first type and of said second type, respectively, wherein individual ones of said second type packets having said prescribed output information stored in said at least second



queue means are not supplied as an output at least until a corresponding computed scheduled time of service has occurred and wherein individual ones of said first type packets having said prescribed output information stored in said at least first queue means are supplied as an output otherwise.

4,979,166

MULTIPLEXING APPARATUS

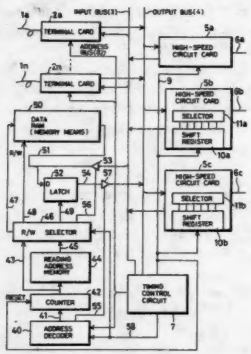
Yoshiko Yamada, c/o Mitsubishi Denki Kabushiki Kaisha, Communications Equipment Works, 1-1, Tsukaguchi Honmachi 8 chome, Amagasaki-shi, Hyogo, Japan, assignor to Yoshiko Yamada, Hyogo, Japan

Filed Jul. 26, 1989, Ser. No. 385,147

Claims priority, application Japan, Aug. 5, 1988, 63-195703

Int. Cl.[5] H04J *3/22*

U.S. Cl. 370—84 **17 Claims**



1. An apparatus for multiplexing a plurality of high and low speed circuits on a time share basis to allow for data transfer between the plural high and low speed circuits, the apparatus comprising:

plural terminal cards for transmitting and receiving data at low speed, each connected to one of said plural low speed circuits, respectively;

plural high-speed circuit cards, for transmitting and receiving data at high speed, each connected to one of said plural high speed circuits, respectively;

memory means, operatively connected to each of said plural high-speed circuit cards, for storing data transmitted from at least one of said plural high-speed circuit cards to be subsequently output to a different of at least one of said plural high-speed circuit cards;

timing control means, operatively connected to each of said plural terminal cards and each of said plural high-speed circuit cards, for converting the low speed of the data of said plural terminal cards, corresponding to addresses of said plural terminal cards, to addresses of said plural high-speed circuit cards and for controlling transmission of the speed converted data to said plural high-speed circuit cards to thereby provide multiplexing and timing control; and control means, operatively connected to said timing control means and said memory means, for inputting first and second control signals in conjunction with said timing control means, to control transmission of data to said memory means and outputting of data from said memory means, respectively, to thereby allow for data transfer between said plural high-speed circuits.

4,979,167

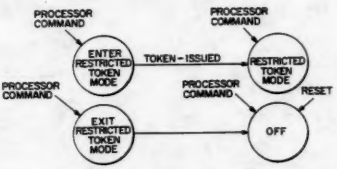
METHODS AND APPARATUS FOR PERFORMING RESTRICTED TOKEN OPERATIONS ON AN FDDI NETWORK

John F. McCool, Cupertino, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 2, 1988, Ser. No. 278,724

Int. Cl.[5] H04J *3/00, 3/14, 3/16*

U.S. Cl. 370—85.4 **23 Claims**



20. A media access controller which supports both restricted and nonrestricted token operations in an FDDI network wherein said controller has an OFF state, an Enter Restricted Token Mode state, a Restricted Token Mode state and an Exit Restricted Token Mode state comprising:

(a) means for receiving a first primative that defines the class of token that can be captured for the purposes of transmitting asynchronous data; and

(b) means for receiving a second primative at the end of each transmit request that specifies the type of token that will be issued at the end of a transmission.

4,979,168

DYNAMIC SENSING POINT CSMA PACKET SWITCHING CONTROLLER

Pierre-Jacques F. Courtois, Rhode; Guy F. J. Scheys, Brussels, and Pierre-Nicholaas W. Semal, Lasnes, all of Belgium, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 28, 1988, Ser. No. 265,363

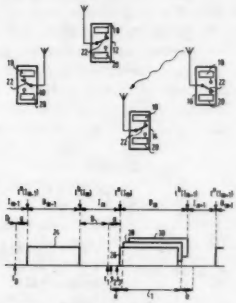
Claims priority, application United Kingdom, Oct. 30, 1987, 8725487

Int. Cl.[5] H04J *3/16*

U.S. Cl. 370—95.1 **35 Claims**

1. A controlled carrier sense multiple access (CSMA) packet switching system comprising at least two stations each of the stations comprising sensing means for sensing if a communications channel is busy; channel control means for determining: TS_u = the scheduling time interval that maximises the expected throughput when all the stations compete for the channel access, TS_l = the scheduling time interval that maximises the expected throughput when two stations compete for the chan-

nel access, TS_{n-1}=the scheduling time interval determined in a preceding (n−1)th observation interval, G_{n-1}=the average offered load in the (n−1)th observation interval, and G_o=the nominal average offered load;



the channel control means including scheduling means responsive to the sensing means for scheduling a new sensing point at random in a dynamically determined time interval

$$TS_n = \min\left(TS_u, \max\left(TS_1, TS_{n-1} \cdot \frac{G_{n-1}}{G_o}\right)\right)$$

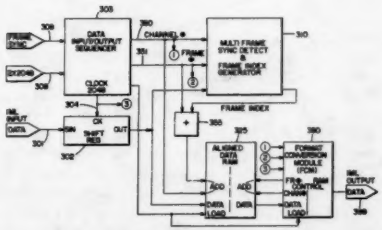
when the channel is sensed busy.

4,979,169

METHOD AND APPARATUS FOR PERFORMING FORMAT CONVERSION BETWEEN BIT STREAMS

Gary R. Almond, Frederick, Md., and Daniel A. Nobile, Alexandria, Va., assignors to Data General Corporation, Westboro, Mass.

Filed Feb. 14, 1989, Ser. No. 310,454
Int. Cl.[5] H04J *3/02, 3/06*
U.S. Cl. 370—99 **14 Claims**



1. Apparatus, for use in a digital communication system that carries data in a plurality of sub-rate data formats, for converting a first serial bit stream, with data embedded therein in accordance with a first predefined sub-rate data format, into a second bit stream, with data embedded therein in accordance with a second predefined sub-rate data format, comprising:

(a) means for locating and extracting the sub-rate data, formatted in accordance with said first predefined sub-rate data format, embedded in said first serial bit stream;

(b) means, coupled to said means for locating and extracting, for aligning and storing said extracted data; and

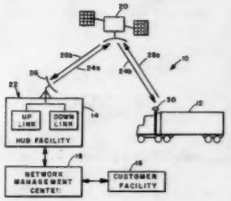
(c) conversion means, coupled to said means for aligning and storing, for construction said second serial bit stream from the stored extracted data utilizing a bit map designed to organize said second serial bit stream in accordance with said second predefined sub-rate data format.

4,979,170

ALTERNATING SEQUENTIAL HALF DUPLEX COMMUNICATION SYSTEM

Klein S. Gilhousen, San Diego; Franklin P. Antonio, Del Mar; Irwin M. Jacobs, La Jolla, and Lindsay A. Weaver, Jr., San Diego, all of Calif., assignors to Qualcomm, Inc., San Diego, Calif.

Filed Jan. 19, 1988, Ser. No. 145,176
Int. Cl.[5] H04B *7/212, 7/216*
U.S. Cl. 370—104.1 **58 Claims**



1. A communication system for transferring messages between central communication stations and one or more of a plurality of mobile terminals through Earth orbital relay satellites, comprising:

at least one central communication station having first transceiver means for transmitting a first communication signal in the form of Time Division Multiplexed communication signals, which comprise a series of N channels which are separated into A address channels and D data channel;

said central communication station further comprising:

receiver assignment means for detecting which of said plurality of mobile terminals each message is directed to;

channel assignment means for assigning at least one channel to each of said messages at a time from said D channels;

address control means for transferring a terminal address and an associated channel assignment onto one of said A channels in response to input messages intended for a corresponding terminal; and

message input means connected to said channel assignment means for receiving digital messages and transferring said messages onto said D channels in response to an assignment from said channel assignment means; and

at least one mobile terminal having second transceiver means for receiving and demodulating said first communication signal, and for transmitting at a predetermined transmit duty cycle, second communication signals to at least one of said central communication stations.

4,979,171

ANNOUNCEMENT AND TONE CODE GENERATOR FOR TELEPHONIC NETWORK AND METHOD

James P. Ashley, Downers Grove, Ill., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 3, 1989, Ser. No. 347,293
Int. Cl.[5] H04J *3/00, 3/12*
U.S. Cl. 370—110.2 **16 Claims**

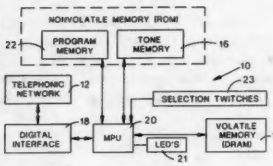
1. An apparatus for generating both tone codes and announcement codes for connection with a telephonic switching system, comprising:

a first memory for storing at least one PCM binarily encoded announcement;

a second memory for storing at least one PCM binarily encoded tone;

a single digital interface for coupling both the PCM binarily

encoded announcements and the PCM binarily encoded tones to a telephonic switching system; and



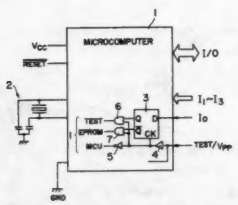
a controller including a microprocessor for selectively providing at least one PCM binarily encoded announcement and at least one PCM binarily encoded tone to said single digital interface.

4,979,172

MICROCOMPUTER

Kazuyuki Murase, Kawasaki, and Naoyasu Tasaka, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1988, Ser. No. 289,803
Claims priority, application Japan, Dec. 26, 1987, 62-330436
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—16.1 **3 Claims**



1. An apparatus comprising:

a microcomputer with at least an MCU terminal, a TEST terminal and an EPROM terminal, said microcomputer capable of operating in at least a microcomputer mode activated by an MCU signal input to said MCU terminal, a test mode activated by a TEST signal input to said TEST terminal and an EPROM mode activated by an EPROM signal input to said EPROM terminal; and

power supply testing/programming means for receiving a testing/programming signal and a control signal, and for outputting said MCU, TEST and EPROM signals, said MCU signal indicating said microcomputer mode whenever said control signal is in a first logic level and said testing/programming signal is in a first logic state, said TEST signal indicating said test mode whenever said control signal is in a second logic level and said testing/programming signal is in a second logic state, and said EPROM signal indicating said EPROM mode whenever said control signal is in a first logic state and said testing/programming signal is in a first logic state.

4,979,173

BURST MODE ERROR DETECTION AND DEFINITION

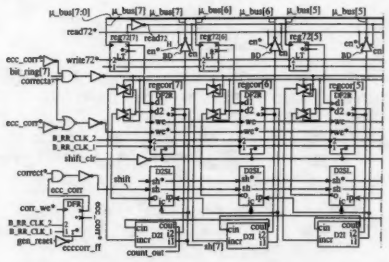
John S. Geldman, Los Gatos, and Petro Estakhri, Fremont, both of Calif., assignors to Cirrus Logic, Inc., Milpitas, Calif.

Filed Sep. 21, 1987, Ser. No. 99,353
Int. Cl.[5] G06F *11/10*; H03K *23/40*
U.S. Cl. 371—39.1 **11 Claims**

1. In a network for detecting digital signal errors, the network including an M-bit linear feedback shift register for digital signal encoding and decoding and error pattern definition by division of a digital signal by one of a plurality of predetermined error check polynomials, an improvement wherein the network includes a q-bit data register, directly or indirectly connected to said linear feedback shift register, that can load data from q parallel data lines into said q-bit data register, can read data to q parallel data lines from said q-bit data register, can shift data from said q-bit data register to said linear feedback shift register, and can operate as a counter, which in response to a predetermined limit count controls the process of an error pattern computation phase of a correction mode, said q-bit data register having q substantially identical processors numbered r=0,1, . . . , q—1, with processor no. r comprising:

a latch cell having a first data input terminal, a first control input terminal and a first data output terminal to receive, as a first data input signal at said first data input terminal, one bit of q consecutive bits of data from a data line and to hold that bit for issue as a first data output signal at said first data output terminal, to receive a first control signal at said first control input terminal, and in response to receipt of a first control input signal of a first predetermined voltage value, to transmit said first data input signal as said first data output signal, and, in response to receipt of the binary compliment of said predetermined first voltage value, to transmit said previously-received first data input signal to said first data output terminal;

a multiplexer having second and third data input terminals, a second control input terminal and a second data output



terminal, to receive at said second data input terminal a second data input signal that is a fifth data output signal from processor no. r, to receive at said third data input terminal a third data input signal that is a fourth data output signal from processor no. r, to receive at said second control input terminal a second control input signal that determines whether said second data input signal or said third data input signal shall be transmitted by said multiplexer to said second data output terminal, and to transmit to said second data output terminal a second data output signal that is said second data input signal or said third data input signal, as determined by said second control input signal;

a data storage cell having fourth and fifth data input terminals, a third control input terminal, a clock phase input terminal and a third data output terminal, to receive at said fourth data input terminal a fourth data input signal that is said first data output signal from processor no. r, to receive at said fifth data input terminal a fifth data input signal that is said second output signal from processor no. r, to receive at said third control input terminal a third control input signal that determines whether said fourth data input signal or said fifth data input signal shall be stored at said third data output terminal for subsequent transmittal as a third data output signal by said storage cell, to receive at said clock phase input terminal a substantially periodic clock phase input signal that changes

phase at least twice during each clock cycle and determines when the signal held at said third data output terminal shall be transmitted, and to transmit to said third data output terminal as a third data output signal, the signal that appears at said third data output terminal, at a time determined by said clock phase input signal;

a data shift cell having sixth and seventh data input terminals, a fourth control input terminal and a fourth data output terminal, to receive at said sixth data input terminal a sixth data input signal that is said third data output signal from processor no. r, to receive at said seventh data input terminal of processor unit number r (r=1,2, . . . q−1) a seventh data input signal that is said third data output signal from processor no. r−1, to receive at said fourth control input terminal a fourth control signal that determines whether said sixth data input signal or said seventh data input signal shall be transmitted by said data shift cell, and to transmit a fourth data output signal that is said sixth data input signal or said seventh data input signal, as determined by said fourth control input signal;

a counter cell having eighth and ninth data input terminals and fifth and sixth data output terminals, to receive at said eighth data input terminal an eighth data input signal that is said sixth data output signal of processor no. r−1 (r=1,2,. . . q−1), to receive at said ninth data input terminal a ninth data input signal that is said third data output signal to processor no. r, to transmit at said fifth data output terminal a fifth data output signal that is the binary sum without carry, of said eighth and ninth data input signals, and to transmit at said sixth data output terminal a sixth data output signal that is the carry bit of the binary sum of said eighth and ninth data input signals; and

a drive cell having having a tenth data input terminal, a fifth control input terminal and a seventh data output terminal, to receive at said tenth data input terminal as a tenth data input signal said third data output signal from processor no. r, to receive a fifth control input signal at said fifth control input terminal, and to transmit said third data output signal as a seventh data output signal at said seventh data output terminal in response to receipt of a fifth control input signal having a voltage equal to a second predetermined voltage value at said fifth control input terminal,

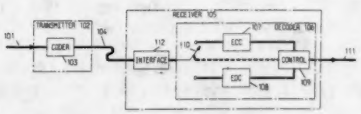
where said seventh data input signal of processor unit number r=0 is held at a third predetermined, substantially constant voltage, and said eighth data input signal of processor no. r=0 has a fourth predetermined voltage value if said q-bit data register is operating as a counter and has a different voltage value if said q-bit data register is not operating as a counter, and where said integer M is divisible by the integer q.

4,979,174

ERROR CORRECTION AND DETECTION APPARATUS AND METHOD

Ying Cheng, Middletown, and Subrahmanyam Dravida, Toms River, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 29, 1988, Ser. No. 291,900
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—41 **19 Claims**



1. Apparatus for receiving input digital data coded using a predetermined error correction code, said apparatus comprising

first means capable of correcting a first number of errors in the received data and capable of detecting errors in the received data at a first probability rate;

second means capable of correcting a second number of errors in the received data, which is greater than said first number of errors, and capable of detecting errors in the received data at a second probability rate less than said first probability rate;

means for deriving an error signal from said received data; and

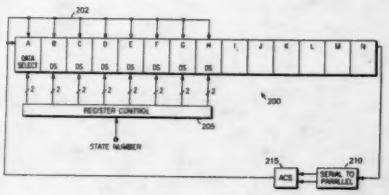
control means for applying said received data to said first means, and subsequently in response to said error signal indicating a first predetermined number of corrected errors in said received data, which is less than or equal to said first number, thereafter applying said received data to said second means, and thereafter in response to a subsequent error signal indicating a second predetermined number of corrected errors in said received data, which is less than or equal to said second number and greater than said first number, thereafter again applying said received data to said first means.

4,979,175

STATE METRIC MEMORY ARRANGEMENT FOR A VITERBI DECODER

Jeffrey A. Porter, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 5, 1988, Ser. No. 214,966
Int. Cl.[5] H03M *13/12*
U.S. Cl. 371—43 **14 Claims**



14. A state metric memory arrangement for a VITERBI decoder comprising:

register means for storing a plurality of state metrics, said register means operating to serially shift each of said plurality of state metrics a predefined number of times;

state metric calculation means connected to said register means, said state metric calculation means operating upon required pairs of state metrics to produce new state metrics in a particular order for storage; and

said register means further operating to store certain ones of said new state metrics interleaved with others of said new state metrics.

4,979,176

ACOUSTO-OPTICAL DEVICE WITH LITHIUM TANTALATE TRANSDUCER

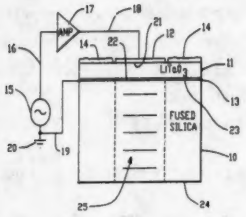
Eddie H. C. Young, Melbourne, Fla., and James J. Jacob, Atherton, Calif., assignors to Spectra-Physics, San Jose, Calif. and Newport Electro Optic Systems, Melbourne, Fla.

Filed Nov. 28, 1988, Ser. No. 276,613
Int. Cl.[5] H01S *3/117, 3/98*
U.S. Cl. 372—13 **25 Claims**

1. An acousto-optical device comprising:

an optically isotropic solid state substrate having optical

characteristics affected by an acoustic wave within the substrate;



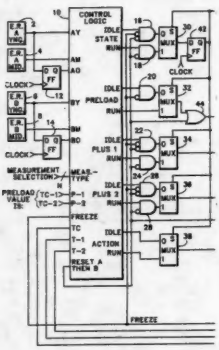
a transducer, coupled to the substrate, for inducing the acoustic wave within the substrate, the transducer comprising lithium tantalate ($LiTaO_3$).

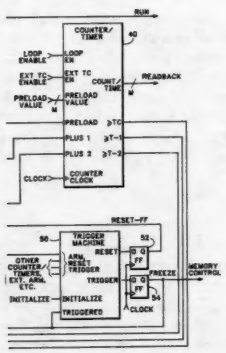
4,979,177

ENHANCED COUNTER/TIMER RESOLUTION IN A LOGIC ANALYZER

Ronald M. Jackson, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 26, 1989, Ser. No. 427,157
Int. Cl.[5] G04F *10/04*
U.S. Cl. 377—20 **8 Claims**





1. A method for counting/timing intervals of interest in a digital data acquisition instrument, the method comprising the steps of:

acquiring data by sampling actual data using a plurality of phases of a system clock;

separately recognizing events in the data acquired using each system clock phase;

aligning the data acquired using each system clock phase to a same edge of the system clock;

aligning the separately recognized events to the same edge of the system clock;

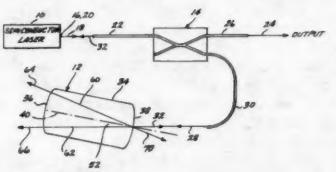
reconstructing, from the aligned separately recognized events, intervals of interest in the actual data with a resolution as high as the plurality of phases permits so that the intervals of interest may be counted/timed with the resolution as high as the plurality of phases permits.

4,979,178

TUNABLE NARROW-LINEWIDTH SEMICONDUCTOR LASER

Raymond G. Beausoleil, Redmond; Ronald L. Hagman, Renton, and John A. McGarvey, Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 20, 1989, Ser. No. 368,654
Int. Cl.[5] H01S *3/10*
U.S. Cl. 372—20 **20 Claims**



1. A system for tuning a semiconductor laser having an output port, an input port, and means for producing a laser beam at the output port, such that the laser beam has a desired frequency, the system comprising:

an optical resonator, the resonator comprising means defining a resonator optical path, an electro-optic material positioned in the resonator optical path, and an electrode for receiving a resonator control signal having a voltage level and for generating an electric field in the electro-optic material in response thereto, whereby the resonator has a resonant frequency that can be varied by varying the voltage level of the resonator control signal;

coupling means for coupling a portion of the laser beam into the resonator such that the resonator produces a feedback beam, and means for coupling the feedback beam into the input port to provide optical feedback to the laser; and

control means for providing the resonator control signal at a voltage level such that the optical feedback causes the laser to produce the laser beam at the desired frequency.

4,979,179

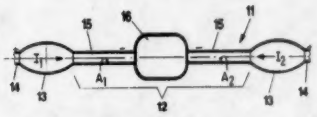
DIVIDED HOLLOW CATHODE LASER

Sverker H. A. Segerstad, Langasliden 28, S-412 70; Charlotte Carlsson, Riddaregatan 21 N, S-416 69, both of Goteborg, Sweden, and Jerzy Mizeraczyk, Jana Hus 9, Gdansk Oliwa, Poland

PCT No. PCT/SE88/00431, § 371 Date Feb. 22, 1990, § 102(e) Date Feb. 22, 1990, PCT Pub. No. WO89/02173, PCT Pub. Date Mar. 9, 1989
PCT Filed Aug. 24, 1988, Ser. No. 465,128
Claims priority, application Sweden, Aug. 24, 1987, 8703289
Int. Cl.[5] H01S *3/97*
U.S. Cl. 372—88 **8 Claims**

1. A device in gas lasers, especially white light lasers and of the kind which comprises at least one gas discharge tube in the form of an electrode segment (11) comprising at least one cathode electrode (12) arranged between anode electrodes

(14), the electrode surfaces of said cathode electrode being exposed to gas and end members (18) enclosing a gaseous medium within the segment (11) characterized in, that the cathode electrode (12) between the anode electrodes (14) is divided in two preferably essentially equally long tube parts



(15) designed with inner, cylindrical electrode surfaces (A_1, A_2), that between the tube parts there is arranged a widened portion (16) which leads to the tube parts (15), and that an anode electrode (14) is via an insulator (13) connected to the end of each tube part (15) facing away from the widened portion.

4,979,180

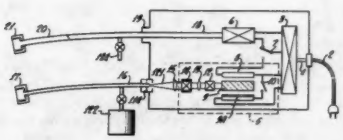
MODULAR INTERCHANGEABLE LASER SYSTEM

Arthur M. Muncheryan, 1735 N. Morningside St., Orange, Calif. 92667

Filed Nov. 24, 1989, Ser. No. 440,725

Int. Cl.[5] H01S *3/08*

U.S. Cl. 372—92 **30 Claims**



1. A modular interchangeable laser system, comprising a modular housing means provided therein with an interchangeable radiation source energized by an electric current supply means having a current-control means and a radiation-generator control means independently operable by a double-throw switch means disposed in said housing said modular housing means having a radiation outlet means and a current outlet means being positioned side by side in one wall thereof and respectively connected to a radiation-conduit means and to a current-carrying conduit means, with said current outlet means being in electrical contact with said electric current supply means; said current-carrying conduit means provided with coupling means adapted to be connected to one end of a hand-held modular stylus having therein a laser beam-generating and amplifying means energized by the current from said current-carrying conduit means, and a laser-beam spectrum modifying means disposed therein in the path of the laser beam emitted by the laser beam-generating means to modify and project said laser beam to the exterior of said modular stylus; said radiation conduit means being in optical connection at one end thereof with said interchangeable radiation source, through said radiation outlet means and at the other end being adapted with means to be connected to a modular section of a modular stylus to form a unitary laser system theretogether; a peripheral spacing within each of said conduits and in said modular stylus adapted to receive a gaseous element from an external source connected to said conduits for transmittal of said gaseous element through either of said conduits into said modular stylus for conduction therethrough to the exterior thereof during laser-processing a workpiece.

4,979,181

VACUUM LASER IRRADIATING APPARATUS

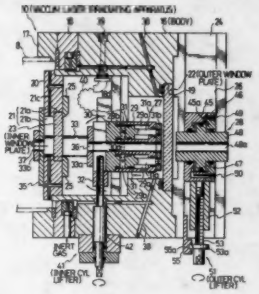
Megumi Nakanose, Sagamihara; Naoyuki Koyama, Tokyo; Mitsunori Aoshiba, Sagamihara, and Tadao Motegi, Mitaka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 3, 1990, Ser. No. 503,756

Claims priority, application Japan, Apr. 28, 1989, 1-111693; Apr. 28, 1989, 1-111694; Apr. 28, 1989, 1-111695; Apr. 28, 1989, 1-111696

Int. Cl.[5] H01S *3/08*

U.S. Cl. 372—98 **10 Claims**



1. A vacuum laser irradiating apparatus disposed between a laser generator and a vacuum vessel in which an object to be irradiated with a laser beam is placed, said vacuum laser irradiating apparatus comprising:

(a) an apparatus body formed with an internal cavity having an inner opening coupled to the vacuum vessel and an outer opening coupled to the laser generator, for guiding a laser beam generated by the laser generator to the object placed within the vacuum vessel;

(b) an outer window plate airtightly fixed to the outer opening of said apparatus body to maintain the internal cavity of said apparatus body under vacuum condition, for passing the laser beam therethrough; and

(c) means for reinforcing said outer window plate to prevent said outer window plate from being distorted due to pressure difference between an inside vacuum of said apparatus tus body and an outside atmospheric pressure of said apparatus body.

4,979,182

DEVICE FOR POSITIONING AND MELTING ELECTRICALLY CONDUCTIVE MATERIALS WITHOUT A RECEPTACLE

Georg Loboefer, Aachen, Fed. Rep. of Germany, assignor to Deutsche Forschungsanstalt fur Luft-und Raumfahrt eV, Cologne, Fed. Rep. of Germany

Filed Sep. 18, 1989, Ser. No. 408,775

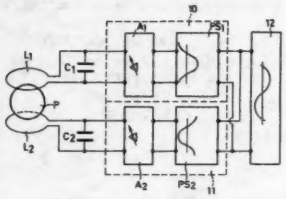
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1988, 3833255

Int. Cl.[5] H05B *6/32*

U.S. Cl. 373—138 **4 Claims**

1. A device for melting and positioning electrically conductive materials, comprising a coil arrangement of two coils arranged on opposite sides of a melting area, through which

coils high-frequency currents of the same frequency flow, characterized in that both coils are connected to separate



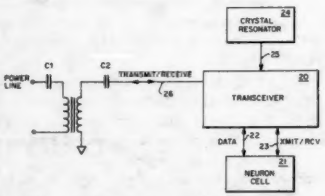
power sources, the relative phase positions of which are variable in a range from 0° to 180°.

4,979,183

TRANSCEIVER EMPLOYING DIRECT SEQUENCE SPREAD SPECTRUM TECHNIQUES

Brooks Cowart, Mt. View, Calif., assignor to Echelon Systems Corporation, Palo Alto, Calif.

Filed Mar. 23, 1989, Ser. No. 328,058
Int. Cl.[5] H04K *1/00*
U.S. Cl. 375—1 **16 Claims**



13. In a communications network having sensing, communications, and control and which contains a plurality of intelligent neuron cells, a transceiver for transmitting and receiving digital data between said cells, said transceiver comprising:

a crystal resonator providing a predetermined reference frequency;

a transmitter including:

a frequency divider for deriving a carrier signal from said predetermined reference frequency such that said predetermined frequency is an integer multiple of said carrier signal;

a pseudonoise generator means for deriving a chip sequence from said predetermined reference frequency such that said chip sequence is an integer multiple of said carrier signal;

locking means for locking the bits of said digital data to said chip sequence and said carrier signal to produce a direct sequence spread spectrum signal for transmission to another transceiver;

a receiver including

a first circuit means for filtering the noise associated with a received direct sequence spread spectrum signal from another transceiver and for amplifying said received direct sequence spread spectrum signal, said first circuit means producing a conditioned direct sequence spread spectrum signal;

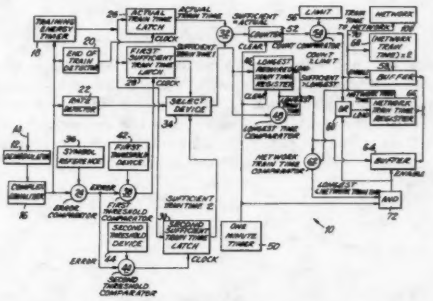
an integrate and dump filter for receiving and demodulating said conditioned direct sequence spread spectrum signal using said carrier signal and said chip sequence.

4,979,184

AUTOMATIC EQUALIZER INITIALIZATION TIME CONTROL FOR MULTIPOINT NETWORKS

Stanley Bottoms, Seminole; William L. Betts, St. Petersburg, and Kenneth Martinez, Pinellas Park, all of Fla., assignors to A.T. & T. Paradyne, Largo, Fla.

Filed May 9, 1989, Ser. No. 349,252
Int. Cl.[5] H04B *3/04*
U.S. Cl. 375—13 **20 Claims**



1. An apparatus for automatically adjusting a period of an equalization training sequence in a communications network comprising:

first means for indicating a period of an equalization training sequence;

second means for indicating convergence of a difference between the equalization training sequence and an expected equalization training sequence to within a threshold value;

determining means responsive to said first and second indicating means for determining if convergence of said difference to within said threshold value occurred within the period of the equalization training sequence; and

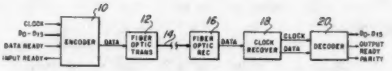
increasing means responsive to said determining means for automatically increasing the period of subsequent initialization training sequences in the event of a number of equalization training sequence free of convergence occurring within an interval.

4,979,185

HIGH SPEED SERIAL DATA LINK

Mark A. Bryans, Dallas; James H. Cline, Allen; Francis B. Frazee, Plano, all of Tex., and Lark E. Lehman, Colorado Springs, Colo., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 30, 1989, Ser. No. 256,954
Int. Cl.[5] H04L *7/04*
U.S. Cl. 375—20 **6 Claims**



2. A system for transmitting data using an asynchronous serial data link, comprising:

(a) an encoder for converting data words represented in parallel format into serial bit streams representing each data word, each data word having a unique start-of-word sequence, said encoder including means for insuring that no more than preselected numbers of consecutive 0's and 1's are present in each said data word including means for inserting extra 1's and 0's into sequences in a data word containing more than such preselected numbers;

(b) a decoder for detecting and removing unique start-of-

word sequences and any extra 0's or 1's inserted by said encoder to convert said serial bit streams into data words; and

(c) transmission means coupled to said encoder and said decoder for communicating serial bit streams from said encoder to said decoder.

4,979,186

TIME DOMAIN RADIO TRANSMISSION SYSTEM

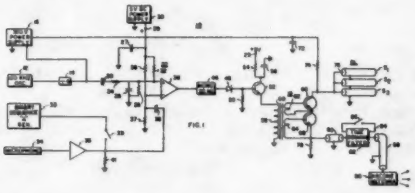
Larry W. Fullerton, Huntsville, Ala., assignor to Charles A. Phillips, Ardmore, Tenn., a part interest

Continuation-in-part of Ser. No. 10,440, Feb. 3, 1987, Pat. No. 4,813,057, which is a continuation-in-part of Ser. No. 677,597, Dec. 3, 1984, Pat. No. 4,641,317. This application Mar. 13, 1989, Ser. No. 322,538

The portion of the term of this patent subsequent to Mar. 14, 2006, has been disclaimed.

Int. Cl.[5] H04B *15/00*; H04K *1/00*

U.S. Cl. 375—23 **23 Claims**



1. A time domain radio transmission system comprising:

antenna means including at least one antenna for coupling signals between said antenna and its environment;

a radio transmitter comprising:

pulse generating means for generating reoccurring pulses units, wherein each pulse unit is comprised of at least one pulse signal,

a source of intelligence signals,

modulation means responsive to said pulse generating means and said source of intelligence signals for providing, as a modulated output, a train of signals wherein at least a discrete edge region of a last-named signal is varied in time position as a function of said intelligence signals,

a D.C. power source, and

power switching means coupled to said antenna and said power source having a control input responsive to a said modulated output for abruptly switching between the states of power applied to said antenna and not being applied to said antenna, whereby discrete switched pulses are transmitted as transmitted signals;

a radio receiver comprising:

receiving means coupled to said antenna means for receiving transmissions and for providing received signals,

signal generating means responsive to a control signal for generating, repetitively, template signals generally corresponding in time to an average time of occurrence of a signal portion of a said received signal from said transmitted signal, and

signal timing means responsive to said received signals and said template signals for generating said control signal; and

demodulation means comprising:

multiplying means responsive to said template signals and said received signals for providing product signals,

signal means including integration means responsive to said product signals for providing an integral signal which is a function of the integral of said product signal, and

means responsive to said integral signal for reproducing said intelligence signals.

4,979,187

PREDICTIVE CODING DEVICE

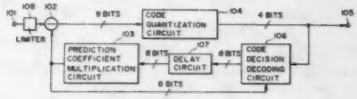
Akio Aoki, and Yoshiki Ishii, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 3, 1989, Ser. No. 332,040

Claims priority, application Japan, Apr. 6, 1988, 63-084254

Int. Cl.[5] H04B *14/06*

U.S. Cl. 375—27 **11 Claims**



1. A predictive coding device comprising:

(a) limiting means for limiting an input value having a first dynamic into a value within a second dynamic range narrower than said first dynamic range;

(b) subtracting means for forming a differential value between an output value of said limiting means and a predictive value;

quantizing means for receiving said differential value and outputting a coding code corresponding to said received differential value, said quantizing means outputting the same coding code for two differential values which are different from each other by a value larger than said second dynamic range; and

(d) predicting means for forming said predictive value by using the coding code which is output from said quantizing means.

4,979,188

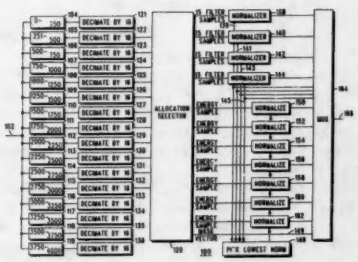
SPECTRALLY EFFICIENT METHOD FOR COMMUNICATING AN INFORMATION SIGNAL

Michael D. Kotzin, Buffalo Grove; Anthony P. van den Heuvel, Arlington Heights; Kenneth J. Crisler, Wheaton; Bradley M. Hiben, Glen Ellyn; Lawrence M. Mohl, Hoffman Estates, and Mark R. Poulin, Forest Park, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 29, 1988, Ser. No. 187,685

Int. Cl.[5] H04B *1/10*

U.S. Cl. 375—34 **20 Claims**



1. A method for transmitting an information signal over a communication channel without use of extensive error coding, comprising the steps of:

(a) sampling and quantizing at least a portion of the information signal to provide a plurality of digitally coded samples;

(b) processing at least a portion of said digitally coded samples to provide a plurality of digitally processed samples, wherein each of the digitally processed samples corresponds to a respective one of the digitally coded samples;

(c) modulating a communication channel using at least some

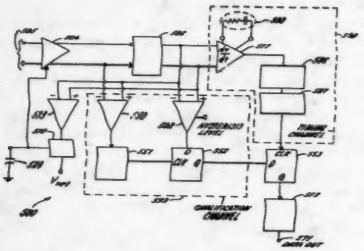
of said digitally processed samples to provide channel symbols, such that each channel symbol has a magnitude of modulation proportional to a characteristic of a respective digitally processed sample, such that received signal quality at a receiver of each channel symbol, and hence each digitally processed sample, will gracefully degrade during adverse transmission conditions.

4,979,189

SELF-TIMING QUALIFICATION CHANNEL

Donald T. Wile, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Aug. 18, 1989, Ser. No. 395,967
Int. Cl.[5] H03K 5/153
U.S. Cl. 375—95 **24 Claims**



22. A method for the detection of valid data pulses in an input signal comprising the steps of:

receiving said input signal;

filtering said input signal to produce a filtered and delayed signal;

comparing said input signal and said filtered and delayed signal to determine a point in time when said filtered and delayed signal is about to reach a peak;

detecting a peak in said filtered and delayed signal during a time period after said point in time.

4,979,190

METHOD AND APPARATUS FOR STABILIZED DATA TRANSMISSION

David J. Sager, Acton; Leon D. Hesch, Leominster; Andrew D. Ingraham, Acton, all of Mass., and William A. Samaras, Seabrook Beach, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 176,570, Apr. 1, 1988, Pat. No. 4,811,364. This application Jan. 30, 1989, Ser. No. 303,846
The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.
Int. Cl.[5] H04L 7/04
U.S. Cl. 375—106 **15 Claims**

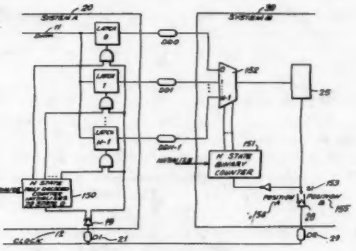
8. A digital system which comprises:

(a) a first system comprising N state devices arranged in parallel;

(b) a second system;

(c) a clock signal having a cycle time coupled by a clock path to the first system and the second system, wherein the clock signal is skewed between the first and second systems and clock signal skew plus data transmission time exceeds the cycle time of the clock signal;

(d) means for operating the N state devices to capture a series of data items being transmitted serially along a data path in a manner through a continuous rotation among the N state devices and to hold each one of the captured data



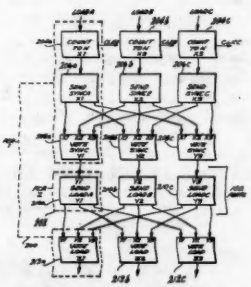
items for a period of time which is greater than the cycle time of the clock signal.

4,979,191

AUTONOMOUS N-MODULAR REDUNDANT FAULT TOLERANT CLOCK SYSTEM

David G. Bond, Kent; Todd Hill, Tukwila; Paul D. Weis, Seattle, and John R. Woods, Auburn, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed May 17, 1989, Ser. No. 352,976
Int. Cl.[5] H04L 7/00
U.S. Cl. 375—108 **25 Claims**



1. A fault tolerant clock system, comprising:

a. a plurality of clocks, each producing time signals;

b. a plurality of counters, each connected to a different one of the plurality of clocks so as to receive the time signals produced thereby, each of the plurality of counters being operative to produce a sync signal that disables an output signal from said different one of the plurality of clocks to which it is connected, after counting a predetermined number of said time signals;

c. a plurality of first signal select circuits, each connected to receive the sync signals from all of the plurality of counters, and each being operative to produce a load signal in response to the order in which the sync signals are received;

d. a plurality of isolation ports, each connected to receive the load signal from one of the first signal select circuits, and operative to produce a plurality of corresponding isolated load signals; and

e. a plurality of second signal select circuits, each connected to receive one of the corresponding isolated load signals from each of the plurality of isolation ports, each second signal select circuit being operative to produce an enable signal in response to the order in which the corresponding

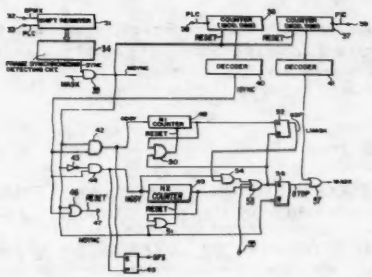
isolated load signals are received, each of the plurality of counters being connected to receive the enable signal produced by a different one of the plurality of second signal select circuits and caused thereby to begin counting the time signals, enabling the output signal of said one clock to which the counter is connected at substantially the same time as others of the plurality of counters respectively enable the output signals of the other clocks, so that all of the plurality of clocks are substantially synchronized.

4,979,192

CIRCUIT FOR DETECTING A SYNCHRONIZING SIGNAL

Kazutoshi Shimizume, and Hirokazu Kuroda, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 20, 1988, Ser. No. 286,714
Claims priority, application Japan, Dec. 23, 1987, 62-325669
Int. Cl.[5] H04L 7/04
U.S. Cl. 375—111 **5 Claims**



1. A circuit for detecting a synchronizing signal, said circuit comprising:

means for reproducing a digital signal including a synchronizing signal from a record medium;

means for supplying a fixed clock signal;

means responsive to the reproducing means for generating a reproduced synchronizing signal;

window means for generating a window signal;

means for generating a reproduced clock signal;

a gate circuit responsive to said reproduced synchronizing signal and window signal for producing a gate output signal; and

first counter means responsive to said gate output signal for counting said reproduced clock signal and generating an insertion synchronizing signal;

wherein said window means comprises second counter means responsive to said fixed clock signal and to said gate output signal for counting said fixed clock signal; and

wherein said gate output signal or said insertion synchronizing signal is employed as a synchronizing detection output signal.

4,979,193

METHOD AND APPARATUS FOR TESTING A BINARY COUNTER

Mayur H. Mehta, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

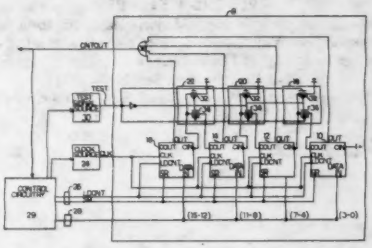
Filed Apr. 26, 1989, Ser. No. 343,215
Int. Cl.[5] H03K 21/40
U.S. Cl. 377—29 **8 Claims**

1. A method of operating an M-bit binary counter to test functions of said M-bit binary counter said M-bit binary counter including a plurality of stages, wherein each of said stages includes an N-bit counter, said method comprising:

a. decoupling said stages of said M-bit binary counter to permit individual operation of said N-bit counter in each of said stages;

b. loading a count value into said N-bit counter in each of said stages;

c. clocking said N-bit counter of each of said stages 2^N times;



d. coupling said stages of said M-bit binary counter back together;

e. clocking said M-bit counter one time;

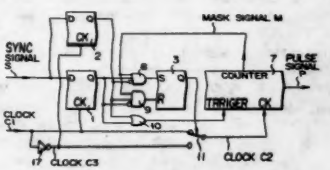
f. checking the output of said counter to determine if the counter is working properly.

4,979,194

CIRCUIT FOR GENERATING PULSE HAVING PREDETERMINED TIME PERIOD WIDTH BASED ON TRIGGER SIGNAL

Mitsumo Kawano, Kumagaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 21, 1989, Ser. No. 410,518
Claims priority, application Japan, Sep. 29, 1988, 63-242221
Int. Cl.[5] H03K 21/02, 21/10
U.S. Cl. 377—55 **15 Claims**



1. A pulse generating circuit comprising:

first input means for inputting a first signal serving as a trigger;

second input means for inputting second and third signals having phases opposite to each other to set a time period width;

first data holding means for obtaining a first hold output in response to the first and second signals respectively output from said first and second input means;

second data holding means for obtaining a second hold output in response to the first and third signals respectively output from said first and second input means;

determination means for determining whether the first hold output from said first data holding means or the second hold output from said second data holding means is output first;

selection means for selecting the second or third signal from said second input means in accordance with a determination result from said determination means; and

counter means for counting the second or third signal selected by said selection means to set a time period width of

a pulse signal to be output, and for generating the pulse signal to be output at a predetermined timing in response to the first and second hold outputs respectively output from said first and second data holding means.

4,979,195

VERTICAL STEPPER

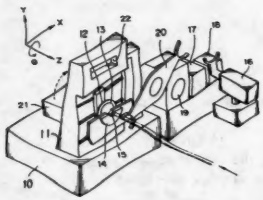
Fumio Tabata, Yokohama; Hidenori Sekiguchi, Isehara; Toru Kamada, and Yuji Sakata, both of Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 20, 1989, Ser. No. 409,713

Claims priority, application Japan, Sep. 22, 1988, 63-237807; Oct. 19, 1988, 63-263184

Int. Cl.[5] G21K *5/00;* B23Q *1/04;* B25B *1/22*

U.S. Cl. 378—34 13 Claims



1. A stepper for transferring a circuit pattern formed on a mask onto a wafer by means of exposure, using a synchrotron radiation source to produce synchrotron radiation in an irradiating direction, said stepper comprising:

a coarse X-Y stage for steppingly moving said wafer in a first plane perpendicular to the irradiating direction of said synchrotron radiation;

a mask stage, having said mask mountable thereon in such a manner that said mask orients in a second plane perpendicular to the irradiating direction of said synchrotron radiation, adapted to be moved for scanning in the second plane perpendicular to the irradiating direction of said synchrotron radiation;

scanning means for scanning said mask stage;

a wafer mounting member having said wafer mountable thereon in such a manner that said wafer orients in a third plane perpendicular to the irradiating direction of said synchrotron radiation and movable between a first position mounted on said coarse X-Y stage and a second position mounted on said mask stage, said wafer mounting member including a fine X-Y stage;

transfer means for moving said wafer mounting member between said first and second positions;

first attracting means for attracting said wafer to said wafer mounting member; and

second attracting means for attracting said wafer mounting member to said mask stage.

4,979,196

MAMMOGRAPH

Olivier Lieutaud, Larmolaye, and Alain Marie, Clamart, both of France, assignors to General Electric CGR S.A., Issy Les Moulineaux, France

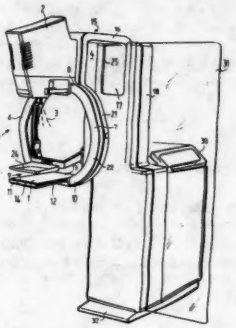
Filed Mar. 6, 1989, Ser. No. 318,836

Claims priority, application France, Mar. 8, 1988, 88 02916

Int. Cl.[5] A61B *6/04*

U.S. Cl. 378—37 7 Claims

1. A mammography device comprising a work top, an X-ray tube oriented towards said work top and a structure for holding the X-ray tube with respect to the work top, said structure comprising a stirrup, firstly to hold the X-ray tube and, secondly, to hold the side edges of the work top by the ends of the legs of the stirrup, said stirrup having the general shape of a ring and comprising, in order to receive the tube in a circular sliding motion with respect to the work top, three rings, a first ring to hold the work top, said first ring being able to slide in



a second ring, said second ring being designed to hold the tube, said first and second rings being held by a third ring in a mutually imbricated way.

4,979,197

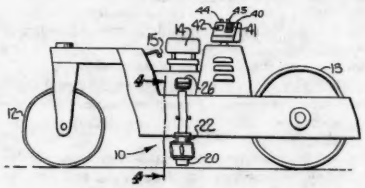
NUCLEAR RADIATION APPARATUS AND METHOD FOR DYNAMICALLY MEASURING DENSITY OF TEST MATERIALS DURING COMPACTION

William F. Troxler, Sr., and Ali Regimand, both of Raleigh, N.C., assignors to Troxler Electronic Laboratories, Inc., Research Triangle Park, N.C.

Continuation-in-part of Ser. No. 865,776, May 22, 1986, abandoned. This application Feb. 17, 1989, Ser. No. 312,128

Int. Cl.[5] G01B *15/02*

U.S. Cl. 378—90 10 Claims



1. A method of measuring the density of a test material using a nuclear radiation backscatter gauge including nuclear radiation source and nuclear radiation detector means positioned in spaced relation to the source, said method comprising

moving the source and detector means relative to the test material while maintaining the source and detector means in spaced relation above the surface of the test material to form an air gap therebetween,

obtaining a count of the photons which are backscattered to the detector means by the test material,

obtaining a measurement which represents the size of the air gap between the surface of the test material and the detector means by ultrasonically measuring the air gap while compensating for variations in the speed of sound due to changes in air temperature in the measuring region, and

calculating the density of the test material as a function of said count of backscattered photons and said measurement of the air gap.

4,979,198

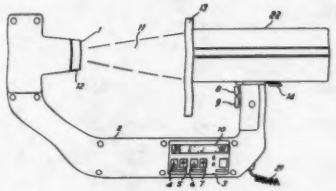
METHOD FOR PRODUCTION OF FLUOROSCOPIC AND RADIOGRAPHIC X-RAY IMAGES AND HAND HELD DIAGNOSTIC APPARATUS INCORPORATING THE SAME

David H. Malcolm, 18 Deer Run Dr., Randolph, N.J. 07869, and George P. T. Wilenius, RR #1, Dunrobin, Ontario, Canada K0A 1T0

Continuation of Ser. No. 224,121, Jun. 20, 1988, which is a continuation of Ser. No. 863,318, May 15, 1986. This application Jul. 3, 1989, Ser. No. 375,124

Int. Cl.[5] H05G 1/10

U.S. Cl. 378—102 8 Claims



1. Hand portable and readily moveable, light weight and diminutive diagnostic apparatus for the provision of a permanent record visable image of portions of a human body responsive to transmission of x-radiation through said body portions comprising

manually manipulable frame means for supporting a source of x-radiation and a radiation responsive image producing means in a predetermined spaced apart relation not exceeding 50 centimeters therebetween to permit interposition of a selected portion of a human body to be examined therebetween,

said source of x-radiation consisting of an x-ray tube having a focal spot not exceeding 1 millimeter square in area for emitting a beam of x-rays centered about a predetermined axis,

low voltage amplification means disposed within said frame means adapted to provide a high frequency low output voltage of up to 30 volts RMS,

high voltage generation means disposed within said frame means adjacent to said source of x-radiation adapted to convert the high frequency output of said low voltage amplification means into a DC voltage output of up to 85 kilovolts for application to said source of x-radiation,

said image producing means including an x-radiation responsive cassette containing an unexposed photographic film for converting x-radiation which passes through said interposed body portion and then uninterruptedly impinges onto said cassette for forming a permanent visable and radiation responsive photographic image thereof, and

said image producing means including independent x-radiation to visable light conversion screen means for producing a viewable permanent photographic image at a resolution level of at least 3.5 line pairs per millimeter.

4,979,199

MICROFOCUS X-RAY TUBE WITH OPTICAL SPOT SIZE SENSING MEANS

Michael K. Cueman, Niskayuna; Lewis J. Thomas, III, Schenectady; Casmir R. Trzaskos, Amsterdam, all of N.Y.; August D. Matula, Falmouth, Va., and Michael J. Austin, Albany, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 31, 1989, Ser. No. 429,743

Int. Cl.[5] H01J 35/00, 35/14

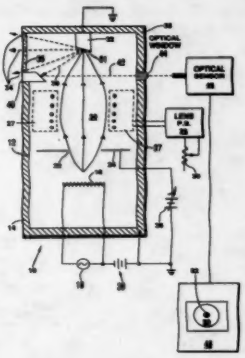
U.S. Cl. 378—121 39 Claims

1. Apparatus for use with a means for emitting first and second types of radiation, said apparatus comprising:

means, disposed proximate the emitting means, for reflecting only said second type of radiation along a path; and

means, disposed in said path, for sensing the reflected radiation.

9. Apparatus for use with a microfocus X-ray tube having an anode means for emitting X-rays, and visible and near infrared



light, when subject to impinging electrons, said apparatus comprising:

a mirror means, disposed proximate the anode, for reflecting only the visible and the near infrared light along a path; and

means, disposed in said path, for sensing the reflected visible and near infrared light.

4,979,200

RADIOGRAPHIC INTENSIFYING SCREEN

Akio Umemoto, Oi; Yuji Aoki, Odawara; Katuyosi Numata, Aikawa, and Hideo Suzuki, Odawara, all of Japan, assignors to Kasei Optonix, Ltd., Tokyo, Japan

Filed Oct. 23, 1989, Ser. No. 425,045

Claims priority, application Japan, Oct. 27, 1988, 63-269601

Int. Cl.[5] G03B 42/04; G01J 1/58; G01N 21/64

U.S. Cl. 378—185 5 Claims

1. A radiographic intensifying screen which comprises a support, a fluorescent layer formed thereon comprising an X-ray excitable phosphor and a binder resin supporting the X-ray luminescent phosphor in a dispersed state, and a protective layer formed on the fluorescent layer, wherein the proportion of the binder resin to the X-ray luminescent phosphor is with a range of from 4 to 8% by weight on the average of the entire fluorescent layer, and the binder resin is distributed in the fluorescent layer so that the proportion of the binder resin to the X-ray luminescent phosphor in the fluorescent layer near the interface of the protective layer is higher than the proportion of the binder resin to the X-ray luminescent phosphor near the interface of the support layer and throughout the remainder of the fluorescent layer.

4,979,201

ENHANCEMENT SYSTEM FOR X-RAY IMAGING

Robert A. Kruger, Salt Lake City, Utah, assignor to Innovative Imaging Sciences, Inc., Salt Lake City, Utah

Filed May 10, 1989, Ser. No. 348,748

Continuation in part of Ser. No. 197,708, May 23, 1988.

Int. Cl.[5] G03B 42/04

U.S. Cl. 378—185 11 Claims

1. An X-ray imaging system for obtaining a photographic image of the X-ray transmissivity of a body, comprising:

a source of X-rays directable at the body;

an X-ray imaging subsystem for receiving a pattern of X-

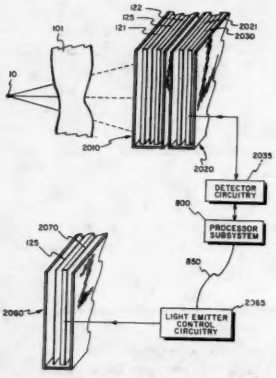
rays transmitted through the body, including, in combination:

a first X-ray-sensitive screen for converting the pattern of X-rays to a first pattern of light;

a light-sensitive film adjacent said first X-ray sensitive screen for receiving said first pattern of light;

a second X-ray sensitive screen for also converting the pattern of X-rays to said first pattern of light;

an array of light detecting devices positioned to receive the first pattern of light from said second X-ray sensitive screen;



means for storing electronic representations of the outputs of said array of light detecting devices;

light generating means responsive to said stored electronic representations for generating a second pattern of light which is directed at and received by said light-sensitive film;

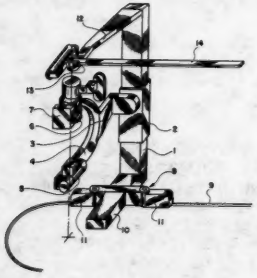
whereby an image is formed on said light-sensitive film as a result of being exposed to said first and second patterns of light.

4,979,202

SUPPORT STRUCTURE FOR X-RAY IMAGING APPARATUS

Aldona A. Siczek, and Bernard W. Siczek, both of 1252 Chinook Way, Boulder, Colo. 80303

Filed Aug. 25, 1989, Ser. No. 398,834
Int. Cl.[5] H05G *1/02*
U.S. Cl. 378—198 **10 Claims**



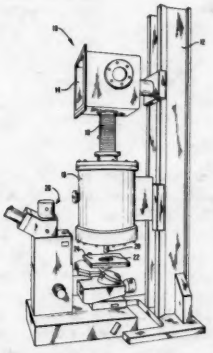
1. A supporting apparatus including: a C-arm supporting an X-ray source and an X-ray image receptor respectively disposed on two opposite extremities of said C-arm, said C-arm being slideably mounted on a vertically extending support; a base moveable following a support rail disposed lengthwise adjacent to and around at least a portion of a patient-table; and a drive means for moving said base.

4,979,203

X-RAY LASER MICROSCOPE APPARATUS

Szymon Suckewer, Princeton; Darrell S. DiCicco, Plainsboro, both of N.J.; Joseph G. Hirschberg, Coral Gables, Fla.; Lewis D. Meixler, East Windsor, N.J.; Robert Sathre, Princeton, N.J., and Charles H. Skinner, Lawrenceville, N.J., assignors to Princeton X-Ray Laser, Monmouth Junction, N.J.

Filed Jun. 19, 1989, Ser. No. 369,206
Int. Cl.[5] G21K *7/00*
U.S. Cl. 378—206 **15 Claims**



1. An x-ray laser microscope apparatus for examining a target comprising:

a source of x-rays in the range of 1 Angstrom to 250 Angstroms for irradiation said target;

means for supporting said target;

developable means sensitive to said x-rays for providing an image of said target, said developable means including a resist material which is substantially transparent to human detectable light; and,

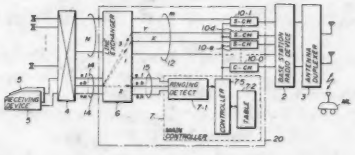
optical means comprising an optical microscope for inspecting said target and aligning said target with respect to said x-rays.

4,979,204

RADIO TELEPHONE SYSTEM HAVING EMERGENCY SPEECH CONTROL

Mitsukazu Oyama, Hachioji, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 8, 1990, Ser. No. 461,709
Claims priority, application Japan, Jan. 12, 1989, 1-5605
Int. Cl.[5] H04Q *7/04*
U.S. Cl. 379—46 **15 Claims**



1. A radio telephone system comprising:

a subscriber exchanger accommodating a plurality of sub-

scribers and a plurality of emergency call receiving devices each having a transmission function;

a line exchanger interfacing with said subscriber exchanger;

emergency speech office lines provided between said subscriber exchanger and said line exchanger;

a plurality of channels coupling mobile stations and said line exchanger;

emergency speech extension lines coupled to said line exchanger and corresponding to said emergency speech office lines one by one;

first control means for coupling a mobile station which is one of said mobile stations and requests an emergency speech to one of said emergency call receiving devices through one of said channels, said line exchanger, one of said emergency speech office lines and said subscriber exchanger;

memory means for storing a subscriber number of said mobile station which requests the emergency speech;

ringing signal detecting means for detecting a ringing signal supplied from said one of said emergency call receiving devices through said one of said emergency speech office lines and a corresponding one of said emergency speech extension lines and directed to said mobile station which precedingly requests said emergency speech and for generating a detection signal when detecting said ringing signal; and

second control means for reading out the subscriber number of said mobile station from said memory means when said detection signal is supplied from said ringing signal detecting means and for coupling said one of the emergency call receiving devices to said mobile station through said subscriber exchanger, said one of said emergency speech office lines, said subscriber exchanger and one of said channels.

4,979,205

CORDLESS TELEPHONE

Shinya Haraguchi, and Kiyonori Nakahara, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 22, 1989, Ser. No. 327,239

Claims priority, application Japan, Mar. 23, 1988, 63-68725

Int. Cl.[5] H04Q 7/04

U.S. Cl. 379—61 **7 Claims**

1. A cordless telephone comprising a base unit connected to a telephone network line and a handset unit connected to said base unit through a communication channel by radio waves when a telephone communication is made, at least one of said handset unit and said base unit including means for transmitting an identification code from said one unit to the other prior to a communication between said handset unit and said base unit, and at least said other unit including means for determining whether or not said transmitted identification code is correct and means responsive to a determination that said transmitted identification code is correct for establishing a communication channel between said handset unit and said base unit;

said handset unit comprising:

switch means for keying in a desired telephone number;

rechargeable means for powering said handset unit;

a first recharging contact;

a first recharge detecting circuit connected to said rechargeable means and said first recharging contact for detecting a recharge of said rechargeable means; and

first memory means for storing said identification code;

said base unit comprising:

a power supply for powering said base unit;

a second recharging contact for making contact with said first recharging contact;

a recharging circuit connected to said power supply and said second recharging contact for recharging said rechargeable means;

a second recharge detecting circuit for detecting a recharge of said rechargeable means by said recharging circuit;

second memory means for storing said identification code; and

means responsive to detection of said second recharge detecting circuit of a recharge of said rechargeable means for controlling said recharging current in accordance with said identification code, whereby said recharging current transmits said identification code from said bas unit to said handset unit through said first and second recharging contacts; and

said handset unit further comprising means responsive to detection by said first recharge detecting circuit of a recharge of said rechargeable means for extracting said identification code transmitted through said first and second contacts and for writing said extracted identification code in said first memory means.

4,979,206

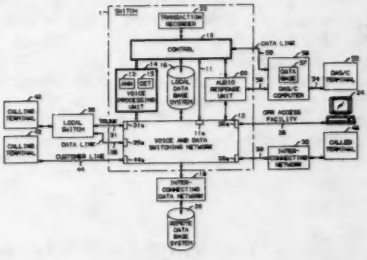
DIRECTORY ASSISTANCE SYSTEMS

Frederick W. Padden, Wheaton, and Werner Ulrich, Glen Ellyn, both of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 72,078, Jul. 10, 1987, abandoned. This application Sep. 18, 1989, Ser. No. 409,973

Int. Cl.[5] H04M 3/54, 1/64, 3/60

U.S. Cl. 379—67 **2 Claims**



1. In a common carrier telecommunication switching network, a method of setting up a call connection comprising the steps of:

dialing a number, different from a standard directory assistance number, from a calling customer station for requesting that a call connection be established from said calling customer station to a destination, said destination to be identified by a directory listing specified from said calling customer station;

receiving from said calling customer station in an automatic speech recognition unit speech signals conveying informa-

tion for identifying said directory listing comprising a directory number;

generating data signals representing speech signals recognized by said automatic speech recognition unit from said received speech signals;

responsive to said data signals, searching a data base for a directory listing, comprising a directory number, corresponding to said data signals; and

if said searching step finds a unique directory listing corresponding to said data signals, transmitting a data message to a switching office of said network for causing said common carrier network to establish a connection between said calling customer station and a destination identified by said directory number.

4,979,207

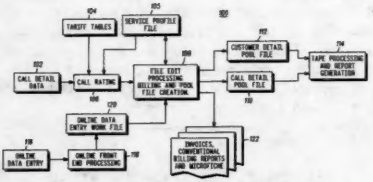
METHOD OF PROCESSING CELLULAR TELEPHONE CALL DETAIL DATA FOR BILLING MULTI-LINE CUSTOMERS FOR CELLULAR TELEPHONE SERVICES

David M. Baum, Alexandria, Va.; Andrea E. Bradshaw, Schaumburg, and Christopher G. McClain, Palatine, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 1, 1990, Ser. No. 473,747

Int. Cl.[5] H04M *7/16, 15/06*

U.S. Cl. 379—112 **8 Claims**


TARIFF TABLES
SERVICE PROFILE FILE
CUSTOMER DETAIL POOL FILE
TAPE PROCESSING AND REPORT GENERATION
CALL DETAIL DATA
CALL RATING
FILE EDIT PROCESSING BILLING AND POOL FILE CREATION
CALL DETAIL POOL FILE
ONLINE DATA ENTRY WORK FILE
ONLINE DATA ENTRY
ONLINE FRONT END PROCESSING
INVOICES, CONVENTIONAL BILLING REPORTS AND MICROFICHE

4. A cellular radiotelephone billing system for processing cellular radiotelephone call data including a multiplicity of user records from one or more cellular systems gathered in a billing pool for billing users, said system comprising:

means for creating a key identification number and an information format for a group of users;

means for associating said key identification and said information format with each user record in the billing pool;

means for obtaining from the billing pool at least one call record and at least one call detail;

means for sorting said at least one call record and said at least one call detail in accordance with said key identification number and said information format;

means for selecting a plurality of user record types to create an abbreviated summary record file; and

means for presenting said abbreviated summary record file in human perceptible form.

4,979,208

METHOD AND APPARATUS FOR ELECTRONIC PAYPHONE OPEN SWITCH INTERVAL MANAGEMENT

Benny J. Pruden, Brownstown; Howard Wisnik, Norristown, and Scott Hudis, West Chester, all of Pa., assignors to Mars Incorporated, McLean, Va.

Filed Jun. 28, 1988, Ser. No. 213,223

Int. Cl.[5] H04M *17/02, 19/00*

U.S. Cl. 379—145 **32 Claims**

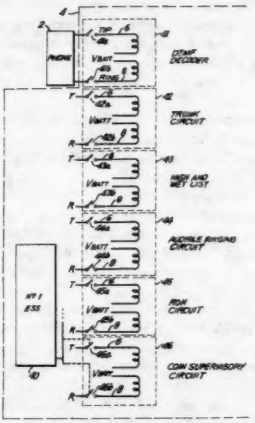
1. A method of controlling the operation of a phone line powered coin operated telephone comprising the steps of:

monitoring an occurrence of an open switch interval;

initiating upon the detection of an open switch interval a power down sequence for a control processing means comprising a micrcontroller, said control processing means controlling the operation of the coin operated telephone;

storing hardware and software status information in nonvolatile memory during the power down sequence following detection of the open switch interval to store a status of the control processing means at the time of the open switch interval;

employing at least one battery powered low power consuming latch circuit to monitor for the entire duration of the



open switch interval, information concerning at least one condition subject to change during the open switch interval; and

initiating upon detection of the end of the open switch interval a power up sequence for resuming processing by the control processing means by returning the control processing means to said status at the time of the open switch interval, and by taking into account any information monitored during the open switch interval.

4,979,209

INDIVIDUAL SUBSCRIBER LINE MODULE

Thomas J. Collins, Wall; Pina Schneider, Ocean Township; Anthony L. Nieves, Bradley Beach, and Thomas G. Graham, Ocean, all of N.J., assignors to Keptel, Inc., Tinton Falls, N.J.

Continuation of Ser. No. 322,361, Mar. 13, 1989, abandoned, which is a division of Ser. No. 139,590, Dec. 30, 1987, abandoned, and a continuation-in-part of Ser. No. 139,590, Dec. 30, 1987, abandoned. This application Oct. 30, 1989, Ser. No. 436,767

Int. Cl.[5] H04M *9/00;* **H01R** *13/44*

U.S. Cl. 379—399 **22 Claims**

1. Module for being mounted removably to telephone network interface apparatus and for interconnecting at least one individual subscriber premises line with at least one individual incoming telephone company line, comprising:

a generally rectangular, hollow box-like structure including a top, opposed sides and opposed first and second ends;

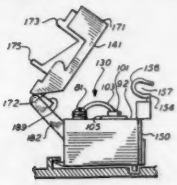
a replaceable subscriber wiring bridge including a pair of generally cylindrical members having a pair of screw wire terminals mounted at the top thereof for connection to said individual subscriber premises line;

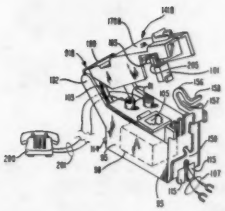
said top provided with a pair of cylindrical holes complementary in shape to and for wedgedly receiving said pair of cylindrical members for removably mounting said subscriber wiring bridge in said module;

at least one plug connected to said pair of subscriber wiring terminals by first electrical conductors;

at least one jack mounted on said top and provided with second electrical conductors for connecting said jack to

said incoming telephone company line, said jack for having said plug plugged therein to interconnect said pair of subscriber wiring terminals and thereby said subscriber premises line to said incoming telephone company line and said plug for being unplugged from said jack to provide a demarcation point between said subscriber premises line and said incoming telephone company line, and upon





said plug being unplugged from said jack said jack for receiving the plug of an operating telephone to facilitate determination of whether a fault exists on said subscriber premises line or said incoming telephone company line; and

mounting means for mounting said module removably to said telephone network interface apparatus.

4,979,210

METHOD AND APPARATUS FOR PROTECTION OF SIGNAL COPY

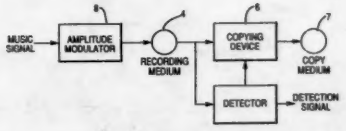
Atsushi Nagata, Hirakata; Yutaka Uekawa, Ashiya; Takanori Senoo, Hirakata, and Kenichi Takahashi, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 8, 1988, Ser. No. 216,495

Claims priority, application Japan, Jul. 8, 1987, 62-170248; Jul. 8, 1987, 62-170249; Sep. 21, 1987, 62-236527; Dec. 15, 1987, 62-316635

Int. Cl.[5] G11B *15/05*

U.S. Cl. 380—3 **5 Claims**



1. An apparatus for detecting copy protection information from a reproduced signal from a recording medium which has recorded therein a signal which is to be protected from being copied and added to an echo signal thereof as the copy protection information, said apparatus comprising:

a low cut filter for removing a low frequency component from the reproduced signal;

a normalizing auto-correlation function calculator for calculating an auto-correlation function from an output signal of the low cut filter;

a maximum function calculator for calculating a maximum value of the auto-correlation function in a specified time period from an output of the normalizing auto-correlation function calculator;

a mean function calculator for calculating a mean value of the auto-correlation function in a specified time period from the output of the normalizing auto-correlation function calculator; and

a level difference discriminator for determining if a difference between said maximum value and said mean value is within a specific range, and for indicating that the copy protection information is present in the reproduced signal when said difference is within said specific range.

4,979,211

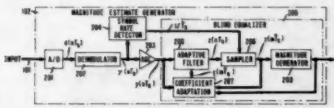
CLASSIFIER FOR HIGH SPEED VOICEBAND DIGITAL DATA MODEM SIGNALS

Nevio Benvenuto, Mestre, Italy, and Thomas W. Goeddel, Fair Haven, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 271,961, Nov. 16, 1988, abandoned. This application Jun. 5, 1990, Ser. No. 534,321

Int. Cl.[5] G10L *5/00*

U.S. Cl. 381—43 **9 Claims**



1. Apparatus for classifying unknown voiceband digital data modem generated signals, comprising:

means for detecting a nominal symbol rate of an incoming unknown voiceband digital data modem signal;

means for generating a sequence of prescribed magnitude estimates of the incoming voiceband digital data modem signal at said detected nominal symbol rate; and

means for employing said sequences of prescribed magnitude estimates to identify the incoming unknown voiceband digital data modem signal as being generated by a particular digital data modem signal source.

4,979,212

SPEECH RECOGNITION SYSTEM IN WHICH VOICED INTERVALS ARE BROKEN INTO SEGMENTS THAT MAY HAVE UNEQUAL DURATIONS

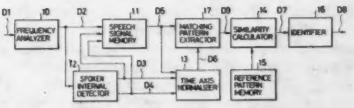
Youichi Yamada, and Keiko Takahashi, both of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 84,108, Aug. 11, 1987, abandoned. This application Oct. 20, 1989, Ser. No. 425,376

Claims priority, application Japan, Aug. 21, 1986, 61-196269

Int. Cl.[5] G10L *7/08, 9/06*

U.S. Cl. 381—45 **16 Claims**



1. A speech recognition system for recognizing speech by performing a frequency analysis on an input speech signal, detecting a spoken interval having a sequence of frames, then determining the similarity between the speech pattern in the detected spoken interval and a set of existing reference patterns by means of linear matching, and outputting as the result of the

recognition process the name of the category containing the reference pattern with the highest similarity among all the reference patterns, wherein the system comprises:

first means for detecting the number of high-power periods in the spoken interval from the acoustic power of the input speech and determining the starting and ending frames of each high-power period;

second means for determining a number of segments into which each high-power period will be split, in the interval from the starting frame of a respective high-power period to the ending frame of the respective high-power period, so that approximately the same number of segments are allocated to each high-power period in the spoken interval when the spoken interval is split into a predetermined number of segments;

third means for calculating an interframe distance score representing a frequency spectrum intensity difference between the speech input of each frame and the speech input of a preceding frame, for each of the frames from the startpoint frame to the endpoint frame of the spoken interval;

fourth means for calculating a cumulative distance score for each of the frames by adding the interframe distance scores from the startpoint frame of the spoken interval to the frame under consideration;

fifth means for calculating boundary threshold values to split the change in the cumulative distance scores during the spoken interval into a predetermined total number of cummulative distance score change intervals which terminate at the threshold boundaries, the total number of cumulative distance score change intervals being equal to the number of segments into which the spoken interval is to be split, the fifth means calculating the boundary threshold values so that, for each high-power period, the difference between the cumulative distance scores at the starting frame and the ending frame of the respective high-power period is split into cumulative distance score change intervals which are equal in magnitude to one another and which are equal in number to the number of segments allocated to the respective high-power period by the second means;

sixth means for splitting the spoken interval into segments at frames where the cumulative distance score is substantially equal to the boundary threshold values;

seventh means for analyzing the input speech signal during each segment of the spoken interval and for outputting a matching pattern which consists of a time-series of feature values representing the analysis of the input speech signal for the respective segments; and

eighth means for comparing the matching pattern with the reference patterns and determining the category containing the reference pattern with the highest similarity.

4,979,213

ORTHOGONALIZED DICTIONARY SPEECH RECOGNITION APPARATUS AND METHOD THEREOF

Tsuneo Nitta, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 12, 1989, Ser. No. 378,780

Claims priority, application Japan, Jul. 15, 1988, 63-176703

Int. Cl.[5] G10L 7/08

U.S. Cl. 381—43 **24 Claims**

1. A speech recognition system, comprising:

acoustic analyzing means for converting input speech into an electrical signal and obtaining speech pattern data upon acoustic analysis of said electrical signal;

means for detecting a speech interval of the electrical signal;

means for generating sampling pattern data by extracting a predetermined number of samples from speech pattern data included in the detected speech interval;

means for prestoring sampling pattern data of a plurality of speakers for categories of speech to be recognized, said sampling pattern data including learning pattern data;

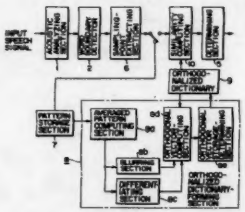
means for forming orthogonalized dictionary data for each speaker on the basis of the sampling pattern data, said forming means forming averaged pattern data of a plurality of sampling pattern data obtained from each speaker;

means for forming dictionary data of a first axis by smoothing the averaged pattern data in a time base direction;

means for forming dictionary data of a second axis orthogonal to the first axis by differentiating the averaged pattern data in the time base direction;

an orthogonalized dictionary for storing the dictionary data of the first and second axes as orthogonal dictionary data;

means for forming additional orthogonal dictionary data representing feature variations in speech of each speaker and orthogonal to the orthogonal dictionary data stored in



said orthogonalized dictionary in accordance with sampling pattern data of each of a second and subsequent of said plurality of speakers on the basis of the orthogonal dictionary data obtained with respect to a first of said plurality of speakers;

means for selectively storing the additional orthogonal dictionary data in said orthogonalized dictionary;

means for computing a similarity value between the orthogonal dictionary data stored in said orthogonalized dictionary and the sampling pattern data formed by said sampling pattern data generating means; and

means for recognizing input speech on the basis of the similarity value.

4,979,214

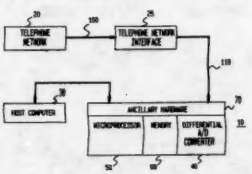
METHOD AND APPARATUS FOR IDENTIFYING SPEECH IN TELEPHONE SIGNALS

Chris A. Hamilton, Montclair, N.J., assignor to Dialogic Corporation, Parsippany, N.J.

Filed May 15, 1989, Ser. No. 351,785

Int. Cl.[5] G10L 3/00

U.S. Cl. 381—46 **12 Claims**



1. A method for identifying a signal which is produced by a human voice which comprises the steps of:

(1) determining when the signal exceeds a first predetermined level;

(2) obtaining the amplitude of the signal and providing a digital representation of the amplitude, if the signal is a digital signal, or obtaining a sample of the amplitude of the signal and providing a digital representation of the sample, if the signal is an analog signal, and grouping the digital representation into frames, a frame being comprised of a predetermined number of consecutive digital representa-

tions of the amplitude of the signal, if the signal is a digital signal, or digital representations of samples of the amplitude of the signal, if the signal is an analog signal;

(3) determining the contents and a measure of the energy of predetermined frequency bins from the contents of the frequency spectrum of the signal for each frame;

(4) summing the measure of the energy of each of the predetermined frequency bins for each frame over a predetermined multiplicity of frames, a frame group, to provide a set of frame group energy measures for the predetermined frequency bins;

(5) determining when the signal falls below a second predetermined level;

(6) determining the time period between the time the signal exceeded the first predetermined level and the time the signal fell below the second predetermined amplitude and identifying the signal as not having been produced by a human voice if the time period is shorter than a first predetermined time period;

(7) comparing the variation in the set of frame group energy measures for all pairs of frame groups which are consecutive in time during the time period with a predetermined library of variations; and

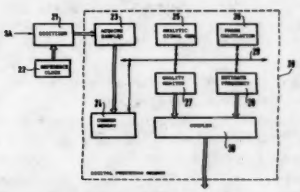
(8) identifying the signal as having been produced by a human voice if the step of comparing finds a match with one of the library.

4,979,215

METHOD OF DIGITALLY EVALUATING THE FREQUENCY AND THE PHASE OF SIGNALS, AND A DEVICE FOR IMPLEMENTING SUCH A METHOD

Sylvain Fontanes, Chatou; Patrice Birot, Courbevoie; André Marguinaud, Palaiseau; Thierry Quignon, Nanterre, and Brigitte Romann, Boulogne Billancourt, all of France, assignors to Societe Anonyme dite : Alcatel Espace, Courbevoie, France

Division of Ser. No. 197,251, May 23, 1988, Pat. No. 4,954,961.
This application May 29, 1990, Ser. No. 529,999
Claims priority, application France, May 21, 1987, 87 07130
Int. Cl.[5] G10L *5/00*; G01R *25/00*; G06F *14/332*
U.S. Cl. 381—49 6 Claims



1. A device for digitally evaluating at least the frequency of an input signal, said input signal being in the form of digitized samples having sample values, said device comprising a digital processor member having an input to which the signal to be analyzed is applied after passing through a digitizer, said digitizer also receiving a stable clock signal, said digital processor member further comprising:

means for deriving an analytic signal from said sample values, said analytic signal having a real portion which coincides with said digitized samples;

means for calculating, in accordance with said sample values, phase values corresponding to the phase of said input signal;

means for estimating the frequency of said input signal by operating on said phase values without using any operator of the Fourier transform type or any hypothesis test either separately or simultaneously; and

means for estimating the difference between the real signal as taken in this way and the signal obtained from the estimated frequency.

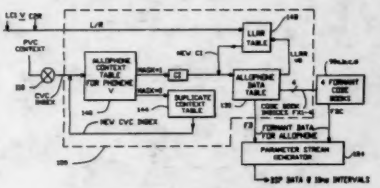
with the output from the digital processor member comprising a digital quality signal representing the quality of said input signal and a frequency measurement signal.

4,979,216

TEXT TO SPEECH SYNTHESIS SYSTEM AND METHOD USING CONTEXT DEPENDENT VOWEL ALLOPHONES

Bathsheba J. Malsheen, 513 Clayton St., San Francisco, Calif. 94117; Gabriel F. Groner, 230 Parkside Dr., Palo Alto, Calif. 94306, and Linda D. Williams, 466 Northlake Dr., San Jose, Calif. 95117

Filed Feb. 17, 1989, Ser. No. 312,692
Int. Cl.[5] G10L *5/00*
U.S. Cl. 381—52 23 Claims



1. In a text-to-speech conversion system having means for converting a specified text string into a corresponding string of consonant and vowel phonemes, each said phoneme being selected from a predefined set of phonemes including a multiplicity of consonant phonemes and a multiplicity of vowel phonemes; parameter generating means for generating speech parameters corresponding to said string of phonemes; and speech synthesizing means for generating a speech waveform corresponding to the speech parameters generated by said parameter generating means; the improvement comprising:

vowel allophone storage means for storing a multiplicity of vowel allophones, each said stored vowel allophone comprising a set of speech parameters; said vowel allophones including allophones for a multiplicity of vowel phonemes;

context table means for assigning one of said vowel allophones to every vowel phoneme context LVR, where V represents any vowel phoneme selected from said multiplicity of vowel phonemes, L represents any consonant phoneme immediately preceding said vowel phoneme V selected from said predefined set of phonemes, and R represents any consonant phoneme immediately following said vowel phoneme V selected from said predefined set of phonemes; said context table means including a distinct entry for every phoneme context LVR denoting which of said vowel allophones is assigned to each said phoneme context LVR; and

vowel allophone generating means, coupled to said vowel allophone storage means, for providing speech parameters representative of a specified vowel phoneme to said parameter generating means, including allophone selection means coupled to said context table means for selecting one of said multiplicity of vowel allophones for each of at least a subset of said vowel phonemes in said string of phonemes, said allophone selection means including context indexing means for determining the phonemes in said string which immediately precede and follow said vowel phoneme in said string of phonemes, said allophone selection means including context indexing means for determining the phonemes in said string which immediately precede and follow said vowel phoneme in said string of phonemes, and table lookup means for assigning to said vowel phoneme the vowel allophone denoted in said

context table means for said vowel phoneme in the context of said preceding and following phonemes;

whereby the speech parameters used to synthesize vowel phonemes represent vowel allophones corresponding to the contexts of said vowel phonemes.

4,979,217

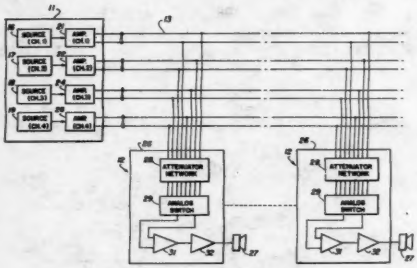
PROGRAMMED AUDIO CONTROLLER

Robert T. Shipley, 6641 Glen Oaks Way, Oakland, Calif. 94611

Filed May 8, 1986, Ser. No. 861,088

Int. Cl.[5] H04B *3/00*

U.S. Cl. 381—81 **12 Claims**



1. In a system for distributing audio signals from a central station to a plurality of listening stations at different locations within a building: a plurality of twisted paris extending between the central station and the different locations, audio amplifiers having a power output on the order of 2–5 watts connected to the twisted pairs at the central station for applying audio signals from different channels to respective ones of the twisted pairs, and a controller at each of the listening stations for selecting the signals to be heard at the different stations, each of said controllers comprising an attenuator having an input impedance on the order of 100,000 ohms connected to the twisted pairs for reducing the level of the audio signals from the twisted pairs, an output amplifier having a power output on the order of 2–5 watts, and switching means connected between the attenuator and the output amplifier for selectively passing the attenuated audio signals from one of the channels to the output amplifier.

4,979,218

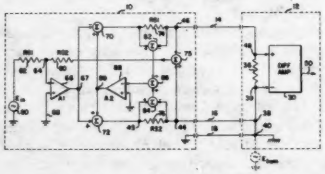
BALANCED OUTPUT CIRCUIT

Chris N. Strahm, Portland, Oreg., assignor to Audio Teknology Incorporated, Durham, Oreg.

Filed May 1, 1989, Ser. No. 345,486

Int. Cl.[5] H04B *15/00*

U.S. Cl. 381—94 **11 Claims**



1. An electronic output transformer circuit adapted to be coupled to a balanced or unbalanced input stage of a remote unit comprising:

means responsive to an input signal for providing an balanced output signal across balanced output lines including a high gain amplifier having said input signal coupled thereto and a differential output stage coupled to the output of said high gain amplifier, the output of said high gain amplifier being applied to respective output lines;

first feedback circuit means coupled between said output lines and the input to said high gain amplifier for forcing the difference in amplitudes of the output signals at said balanced output lines to equal the amplitude of said input signal; and,

second feedback circuit means coupled between said balanced output lines and the input to said differential output stage for maintaining the current in said balanced output lines equal and out-of-phase.

4,979,219

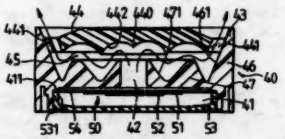
PIEZOELECTRIC SPEAKERS

Kuang-Yao Lin, No. 5, Lane 110, Wei-Kuao Street, Tainan, Taiwan

Filed Mar. 14, 1989, Ser. No. 322,978

Int. Cl.[5] H04R *25/00*

U.S. Cl. 381—190 **4 Claims**



1. A piezoelectric speaker comprising:

a frame including a generally circular side wall portion having a sloped inner side wall; a mid plate defining with the frame a first chamber therebelow having a circular rim and a second chamber thereabove with the circular side wall, the mid plate also defining a throttle hole therethrough interconnecting the first and second chambers;

a diaphragm inserted in the first chamber;

a cover means press-fitted to the frame in the first chamber and having a circular side wall thereof retaining the diaphragm in position by means of a peripheral top edge of the circular side wall coacting with the circular rim of the mid plate;

a piezoelectric transducer element longitudinally bonded underneath to the diaphragm; and,

a reflection cover extending over the second chamber and, spaced from the mid plate, the reflection cover having a contoured inner surface with a curved cross-sectional configuration with a protruding tip located adjacent to the throttle hole of the mid plate and defining a plurality of discharge openings uniformly located around an outer periphery.

4,979,220

INTEGRAL BODY SPEAKER WITH DETACHABLE TERMINAL PLATE

Ding B. Chen, Taipei, Taiwan, assignor to Audiovox International Limited, Taipei, Taiwan

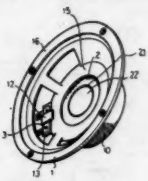
Filed May 5, 1988, Ser. No. 190,332

Int. Cl.[5] H04R *9/06*

U.S. Cl. 381—192 **4 Claims**

1. A speaker comprising a housing (1) and a magnetic core casing (10), said housing (1) also comprising an annular front face (15) which retains both a magnetic plate (2) and a magnetic core (22), a voice coil bobbin and cone assembly (4) being insertable in an annular cavity (21) formed between the magnetic plate (2) and the magnetic core (22), a terminal plate mount (13) being formed on one side of said annular front face

(15) for detachably receiving a terminal plate (3), said speaker being characterized in that the magnetic core casing (10) and



the housing (1) are formed as a single unit by injection molding.

4,979,221

METHOD AND APPARATUS FOR SUB-PIXEL CENTROIDING OF A PHOTON EVENT

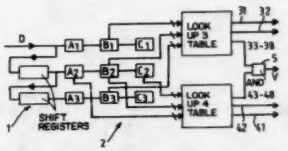
Michael A. C. Perryman, Leiden, and Graham C. Cox, Oegstgeest, both of Netherlands, assignors to Agence Spatiale Europeene, Paris, France

Filed Dec. 23, 1988, Ser. No. 289,603

Claims priority, application France, Dec. 23, 1987, 87 18458

Int. Cl.[5] G06K 9/00

U.S. Cl. 382—1 **9 Claims**



1. A method of defining the position of the center of a light signal received on a charge-coupled device, comprising the steps of:

digitizing the light signal into a stream of digital signals each representing a respective pixel,

sequentially coupling the stream of digital signals to an array of shift registers, in which the last three elements of each shift register are directly accessible to form a three row by three column data analysis array (DAA),

reading out said digital signals from the penultimate three elements in the three rows of said DAA and the last three elements in the middle row of said DAA,

providing a first look up table storing data signals each corresponding to a distinct combination of signal levels of said digital signals from said penultimate three elements of the DAA, each data signal comprising information identifying a particular position in a column of the DAA and a valid event signal to indicate in a true state thereof that a valid light signal is represented by said digital signals,

providing a second look up table storing data signals each corresponding to a distinct combination of signal levels of said digital signals from said last three elements in the middle row of the DAA, each data signal comprising information identifying a particular position in a row of the DAA and a valid event signal to indicate in a true state thereof that a valid light signal is represented by said digital signals,

using the signals read out from said penultimate three elements to address the first look up table to produce corresponding data signals stored therein,

using the signals read out from said last three elements in the middle row to address the second look up table to produce corresponding data signals stored therein, and

concurrently using the data signals produced by said first and second look up tables to determine the relative position of the center of the light signal only when both valid event signals are true, thus indicating a valid light signal.

4,979,222

METHOD FOR PRODUCING A THIRD IMAGE THAT CLARIFIES THE DIFFERENCES BETWEEN TWO IMAGES WHICH ARE ALLOCATED TO ONE ANOTHER

Joerg Weber, Auf dem Muehlenacker 40, 5030 Huerth, Fed. Rep. of Germany

Filed Feb. 21, 1990, Ser. No. 483,085

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1989, 3905234

Int. Cl.[5] G06K 9/00

U.S. Cl. 382—6 **2 Claims**

1. A method for producing a third image that clarifies the differences between two images which are allocated to one another, comprising the steps of:

acquiring first image signals corresponding to the picture elements of a first image;

acquiring second image signals corresponding to the picture elements of a second image;

acquiring third image signals corresponding to the picture elements of a third image by

forming matrices composed of 2×2 image signals of mutually-adjacent picture elements (1_{00}, 1_{01}, 1_{10}, 1_{11}) of the first image,

forming matrices composed of 2×2 image signals of mutually-adjacent picture elements (2_{00}, 2_{01}, 2_{10}, 2_{11}) of the second image;

forming matrices composed of 2×2 image signals of mutually-adjacent picture elements of the third image by allocating the image signals of the first picture elements (1_{00}) of the matrices of the first image to the corresponding picture elements of the third image;

allocating the image signals of the second picture elements (2_{11}) of the matrices of the second image lying diagonally opposite the first picture elements to the corresponding picture elements of the third image;

allocating the image signals of third picture elements (1_{01} or, respectively, 2_{01}) of the matrices of the first and of the second image that are greater with respect to a predetermined parameter to the corresponding picture elements of the third image; and

allocating the image signals of fourth picture elements (1_{10}, or, respectively, 2_{10}) of the matrices of the first image and of the second image lying diagonally opposite one another that are smaller than the image signals of the third picture elements with respect to a predetermined parameter to the corresponding picture elements of the third image,

whereby the regions in which the parameter value of the image signals of the first image is greater than the parameter value of the image signals of the second image are produced in the reproduced image by strips extending in a first direction and the regions in which the parameter value of the image signals of the second image is greater than the parameter value of the image signals of the first image are reproduced in the reproduced image by strips

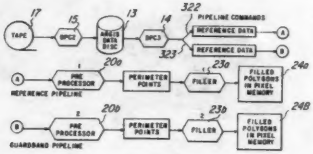
extending in a second direction that extends at a right angle relative to the first direction, and the strips alternately correspond to the image signals of the first image and to the image signals of the second image.

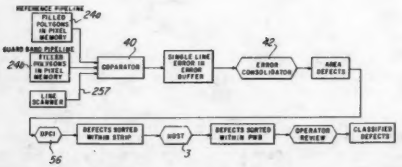
4,979,223

DATA HANDLING SYSTEM FOR PATTERN INSPECTOR OR WRITER

William G. Manns; Anthony B. Wood, both of Dallas, and David A. Norwood, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 25, 1988, Ser. No. 173,523
Int. Cl.[5] G06K 9/00, 9/50
U.S. Cl. 382—8 **4 Claims**





1. A pattern inspection system, comprising:

a data expansion computer system for expanding in real-time a compact database representation of an ideal pattern into a bit-mapped representation of the ideal pattern, which ideal pattern is stored in a plurality of frames of data, and in which the overall geometric shape of the ideal pattern is partitioned into a plurality of constituent contiguous polygons, each contiguous polygon residing in a separate frame of data;

a data-acquisition system for generation pixel data for an inspected pattern; and

a comparator, in electrical communication with the data-acquisition system and the data expansion computer system, for bit-by-bit comparison of the bit-mapped representations of the ideal pattern with the pixel data for the inspected pattern.

4,979,224

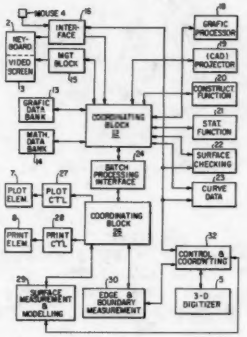
INTERACTIVE GRAPHICS SYSTEM AND METHOD FOR MODELLING PHYSICAL ARTICLES

Roberto Maiocco, and Luciano Basadonna, both of Turin, Italy, assignors to Digital Electronics Automation, Inc., Livonia, Mich.

Filed Sep. 27, 1988, Ser. No. 249,803
Claims priority, application Italy, Oct. 6, 1987, 67848 A/87
Int. Cl.[5] G06K 9/00
U.S. Cl. 382—8 **15 Claims**

1. An interactive system for modelling a physical article in mathematical terms, comprising a measurement device for taking measurements of said article, and processing means coupled to said measurements device so as to receive data on initial identification points on the article for providing automatic signals to control said measurement device in the collection of data on additional points on the article, said processing means constructing a model from all of said data;

said processing means including equipment for the mathematical construction of boundary curves connecting said initial identification points for said model, equipment for the mathematical construction of a surface fitted to the boundary curves, and



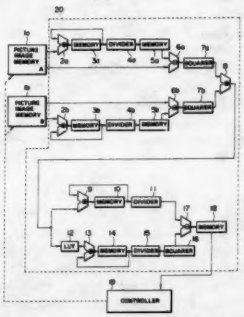
means for determining data collection errors due to the dimensions of said probe of said measurement device and means for mathematically constructing, on the basis of a mathematically defined surface, a second surface free of said data collection errors.

4,979,225

METHOD AND APPARATUS FOR DETECTING CORRESPONDING REGIONS BETWEEN PICTURE IMAGES

Junpei Tsujiuchi, Kawasaki; Shigeto Ikeda, Tokyo; Toshio Honda, Yokohama; Nagaaki Ohyama, Kawasaki, and Susumu Kikuchi, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 25, 1987, Ser. No. 101,311
Claims priority, application Japan, Sep. 26, 1986, 61-227449; Jun. 11, 1987, 62-145528
Int. Cl.[5] G06K 9/46
U.S. Cl. 382—17 **36 Claims**



1. A method for detecting corresponding regions between a plurality of picture images stored within a memory means, comprising respective steps of:

setting respective operation object regions for a pluarlity of picture images stored within said memory means;

detecting mutual picture image concentration distributions in operation object regions for said picture images;

calculating a variance of the mutual picture image concen-

tration distributions in said operation object regions; and thereafter

detecting the operation object regions for said picture images which have been set in which the calculated variance value is at a minimum to thereby detect the corresponding regions between the plurality of picture images, whereby image precision is increased and processing time is reduced.

4,979,226

CODE SEQUENCE MATCHING METHOD AND APPARATUS

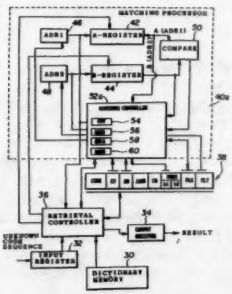
Gen Sato, Yokohama, Japan, assignor to Ricoh Company, Ltd., Japan

Continuation of Ser. No. 118,528, Nov. 9, 1987. This application Aug. 25, 1989, Ser. No. 398,649

Claims priority, application Japan, Nov. 13, 1986, 61-270528; Jul. 8, 1987, 62-170510; Oct. 12, 1987, 62-256654

Int. Cl.[5] G06K 9/18

U.S. Cl. 382—21 **11 Claims**



1. A code sequence matching method adapted to pattern recognition of characters, comprising the steps of:

successively selecting one code from an unknown code sequence which is extracted from an input pattern and indicates the sequence of features of the input pattern, said unknown code sequence comprising a plurality of directional codes successively obtained by tracing a contour of said input pattern from a predetermined starting position;

successively selecting one code from a reference code sequence comprising a plurality of directional codes successively obtained by tracing a contour of a reference pattern from the same starting position as said predetermined starting position;

comparing said one directional code selected from the unknown code sequence with said one directional code selected from the reference code sequence to thereby determine whether the selected directional codes are identical, said comparison step being started from said directional codes located at said starting positions; and

discriminating whether or not the unknown code sequence and the reference code sequence match each other by checking the correspondence between the directional codes of the unknown code sequence and the directional codes of the reference code sequence on the basis of compared results, wherein the reference code sequence has one or more special codes for controlling the order of comparison between the directional codes of the unknown code sequence and the directional codes of the reference code sequence so as to change the relationship between the two directional codes to be compared, and said selecting steps select said directional codes in accordance with said one or more special codes.

4,979,227

METHOD FOR AUTOMATIC CHARACTER RECOGNITION EMPLOYING A LEXICON HAVING UPDATED CHARACTER STRINGS

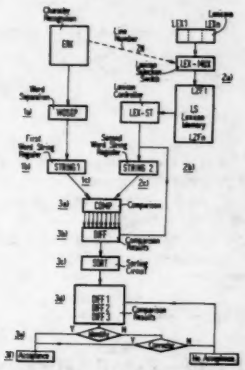
Helmut Mittelbach, Konstanz; Xaver Mueller, Radolfzell, and Peter Schlegel, Konstanz, all of Fed. Rep. of Germany, assignors to Computer Gesellschaft Konstanz mbH, Fed. Rep. of Germany

Filed Oct. 14, 1988, Ser. No. 257,762

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735139

Int. Cl.[5] G06K 9/72

U.S. Cl. 382—40 **1 Claim**



1. A method for automatic character recognition, comprising the steps of:

acquiring character strings by scanning and automatic character recognizing an image pattern, each character string being marked by a word start and a word end;

generating a lexicon by determining which character strings contain no rejection characters and storing and continuously updating the character strings containing no rejection characters, and recording a frequency of occurrence of identical character strings;

comparing each of the character strings to be checked, including character strings having rejection and substitution characters, to the stored character strings of the lexicon, and identifying a plurality of identical or optimally similar lexicon character strings corresponding to the character string being checked;

selecting a lexicon character string that is optimum with respect to similarity and frequency to the character string being checked; and

executing a correction, if necessary, of the character string being checked by comparison to the lexicon character string when a correction is probable for the character string being checked.

4,979,228

VIDEO SIGNAL ENHANCEMENT BY ADAPTIVE DIGITAL SIGNAL PROCESSING

Theodore S. Rzeszewski, Lombard, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 913,701, Sep. 30, 1986, abandoned. This application Nov. 22, 1988, Ser. No. 274,607

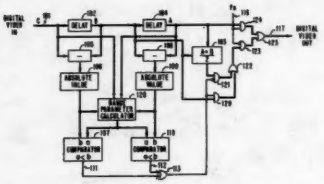
Int. Cl.[5] G06K 9/40

U.S. Cl. 382—54 **14 Claims**

1. An arrangement for improving the resolution of a video picture by processing a baseband video signal used for transmission and storage of said video picture to compensate for degraded rise and fall times of said video signal, comprising:

means for grouping a plurality of digitized multivalued samples representing said baseband video signal into a plurality of sets of samples wherein each of said sets of samples consists of a predefined number of said samples and each of said digitized multivalued samples having a plurality of binary bits;

means for calculating numerical values representing the arithmetic differences between samples of each of said sets of samples;



means for logically determining which of a plurality of predefined patterns corresponds to each of said sets of samples on the basis of the calculated numerical values of each of said sets of samples; and

means responsive to the determined one of said plurality of predefined patterns of samples for each of said sets of samples for inserting samples into each of said sets of samples.

4,979,229

METHOD OF AND APPARATUS FOR CONVERTING THE RESOLUTION OF AN IMAGE REPRESENTED BY A PATTERN OF BIVALENT PIXELS

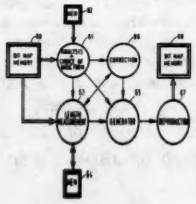
Abraham Moolenaar, Venlo, Netherlands, assignor to Oce-Nederland B.V., Venlo, Netherlands

Filed Feb. 5, 1990, Ser. No. 475,193

Claims priority, application Netherlands, Feb. 6, 1989, 8900284

Int. Cl.[5] G06K *9/00*

U.S. Cl. 382—56 **6 Claims**



1. Method for converting the resolution of an image represented by a pattern of bivalent pixels comprising:

A. searching said pixel pattern for sub-patterns, each of said sub-patterns being formed by two straight rows of pixels, said rows being disposed side-by-side and including rows with a length of one pixel, the pixels forming the rows having the same value per row, and determining the length (in pixels) of sub-patterns located;

B. selecting at least one basic form for each end of sub-patterns located in Step A, said selection for each of said ends being based upon the value of the pixels located in and directly adjoining the sub-pattern;

C. generating a replacement surface for each end of said sub-pattern by making the length of the selected basic form equal to half the length of said sub-pattern;

D. replacing the pixels located between the middle of the sub-pattern and the end for which such form was selected with the replacement surface generated in step C; and

E. reproducing the said replacement surfaces in the form of a new pattern of pixels having a resolution different from that of the original image.

4,979,230

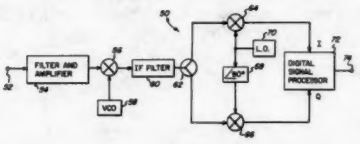
UP-CONVERSION HOMODYNE RECEIVER FOR CABLE TELEVISION CONVERTER WITH FREQUENCY OFFSET TO AVOID ADJACENT CHANNEL INTERFERENCE

Daniel Marz, Dresher, Pa., assignor to General Instrument Corporation, New York, N.Y.

Filed Dec. 4, 1989, Ser. No. 445,970

Int. Cl.[5] H04B *1/30*; H04H *1/00*

U.S. Cl. 455—3 **20 Claims**



1. Apparatus for recovering a baseband signal transmitted on a carrier comprising:

means for receiving a carrier containing a signal within a first frequency band;

means for upconverting said signal to an intermediate frequency sufficiently above said band to prevent harmonic distortion of said signal when recovered at baseband; and

means for inputting the upconverted signal to a homodyne detector operating at a frequency that is offset above said intermediate frequency by an amount sufficient to translate the signal to baseband with a folded spectrum that avoids interference with adjacent channels.

4,979,231

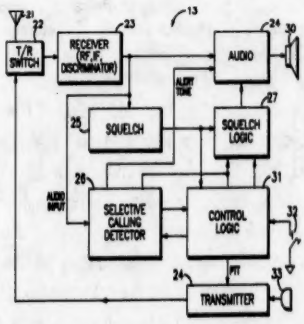
TWO-WAY RADIO FOR USE IN A COMMUNICATION SYSTEM

Brian K. A. Johnson, and Stelios J. Patsiokas, both of Plantation, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 6, 1989, Ser. No. 293,919

Int. Cl.[5] H04B *1/44, 7/26*

U.S. Cl. 455—58 **3 Claims**



1. A two-way radio having an address for use in a communication system comprising:

receiver means for receiving a carrier signal,

address detecting means operatively connected to the receiver means for detecting said address,

carrier detection means for detecting presence or absence of said carrier signal:

transmitter means,

transmit inhibit means for enabling transmission by said transmitter means only in response to detection of said

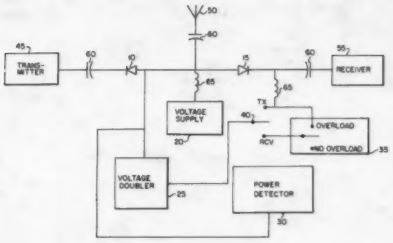
address by said address detecting means and subsequently inhibiting further transmission in absence of detecting said carrier signal by said carrier detection means within a predetermined time interval.

4,979,232

SELF-BIASING SOLID-STATE T/R SWITCH

Donald R. Martz, Webster, and Greg W. Bezjak, Rochester, both of N.Y., assignors to Harris Corporation, Rochester, N.Y.

Filed Aug. 14, 1989, Ser. No. 393,653
Int. Cl.[5] H04B *1/44*
U.S. Cl. 455—78 **7 Claims**



1. A solid-state switch for alternatively coupling and decoupling a receiver to an antenna connected to a transmitter comprising:

(a) a first selective conducting means for coupling said receiver to said antenna responsive to relatively low forward biasing voltage and for decoupling said receiver from said antenna responsive to relatively high reverse biasing voltage;

(b) a low voltage supply connected to said first selective conducting means for providing said relatively low forward biasing voltage;

(c) voltage detection means connected to said antenna for identifying relatively high voltage thereon; and

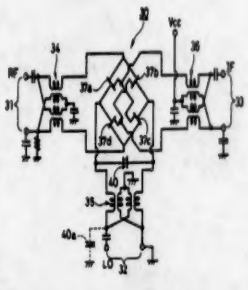
(d) voltage increasing means for increasing the voltages from said transmitter and said antenna and for providing said increased voltage to said first selective conducting means as said relatively high reverse biasing voltage when said transmitter is transmitting and when said voltage detection means identifies relatively high voltage.

4,979,233

HIGH FREQUENCY BROAD-BAND MIXING CIRCUIT INCLUDING AN ELECTROLYTIC CAPACITOR IN PARALLEL WITH A LOCAL OSCILLATOR INPUT PORT

Kazunari Kawahata, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Aug. 17, 1988, Ser. No. 233,210
Claims priority, application Japan, Aug. 19, 1987, 62-206053
Int. Cl.[5] H04B *1/26*
U.S. Cl. 455—330 **13 Claims**



1. A broad-band mixing circuit including a first port adapted to receive a radio frequency signal and a second port adapted to receive a local oscillation signal not lower than 100 MHz, wherein an intermediate signal is outputted at a third port as a function of said radio frequency signal and said local oscillation signal, said broad-band mixing circuit comprising:

a first transmission line transformer connected to said first port adapted to receive said radio frequency signal for converting an unbalanced radio frequency signal from said first port into a balanced signal,

a second transmission line transformer connected to said second port adapted to receive said local oscillation signal for converting an unbalanced local oscillation signal from said second port into a balanced signal,

mixing means for outputting an intermediate frequency signal as a function of said balanced radio frequency signal and balanced local oscillation signal, and

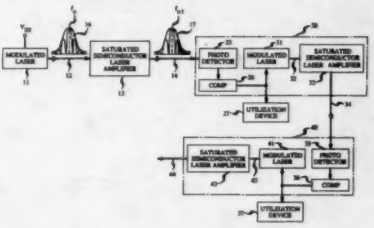
an electrolytic capacitor of at least 1 μF across the balanced output side of said second transmission line transformer.

4,979,234

SATURATED SEMICONDUCTOR LASER AMPLIFIER FOR COMPENSATION OF OPTICAL FIBRE DISPERSION

Govind P. Agrawal, and Nils A. Olsson, both of New Providence, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 20, 1988, Ser. No. 288,340
Int. Cl.[5] G02F *1/00*
U.S. Cl. 455—608 **12 Claims**



1. A fiber-optic communication system for digital transmission of information comprising:

a first saturated semiconductor laser amplifier, for receiving and amplifying a first input stream of optical pulses to produce a first laser amplifier output stream of chirped optical pulses; and

a first optical fiber segment having an input end positioned to receive the first laser amplifier output stream of chirped optical pulses from the first laser amplifier, whereby the chirped pulses of the first laser amplifier output stream are compressed during propagation through an initial portion of the first fiber segment and whereby a first fiber output stream of recognizable optical pulses emanates from an output end of the first fiber segment, the initial portion having a length which is a significant fraction of the length of the fiber segment.

4,979,235

POLARIZATION CONTROLLER FOR USE IN OPTICAL FIBER COMMUNICATION SYSTEM

Scott H. Rumbaugh, Lake Oswego; Michael D. Jones, Portland, and Philip J. Bos, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

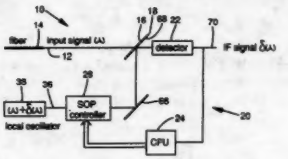
Filed Apr. 17, 1989, Ser. No. 339,281
Int. Cl.[5] H04B *10/06*
U.S. Cl. 455—616 **15 Claims**

1. A state-of-polarization control system for an optical system in which a detector develops a difference signal that is indicative of a difference between a first polarization state of a

first optical signal and a second polarization state of a second optical signal, comprising:

polarization control means including first, second, and third retarding devices for controlling the difference between the first polarization state of the first optical signal and the second polarization state of the second optical signal; and

signal processing means responsive to the difference signal for computing polarization data to which the retarding devices of the polarization control means respond to minimize the difference between the first and second polarization states, the system including in a normal mode of operation during which the first retarding device provides a retardance ψ_z, and the second retarding device provides



a retardance $\theta_p=(4n_1\pm1)\pi/2$, where n_1 is any integer, whenever $n_2\pi<\psi_z<(n_2+1)\pi$, where n_2 is any integer.

DESIGN PATENTS

GRANTED DEC. 18, 1990

ERRATA

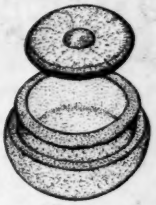
For CLASS	See PATENT NO.
D24-051	313,103

DESIGNS

DECEMBER 18, 1990

312,913
EDIBLE CONE
Mary E. Stanley, P.O. Box 157, Rockingham, N.C. 28379
Filed Jun. 16, 1988, Ser. No. 207,449
Term of patent 14 years
U.S. Cl. D1—118

312,914
PASTRY
Klemens Daldrup, Am Schloss, Graf-Salm-Str. 21, D-5012 Bedburg, Fed. Rep. of Germany
Filed Jan. 22, 1988, Ser. No. 147,378
Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 12 MR 325
Term of patent 14 years
U.S. Cl. D1—122



312,915
FOOTBALL HELMET HAT
Ted A. Gilfert, Station St., Solon, Ohio 44139, and Kevin W. Morgan, Stimpson Ave., Athens, Ohio 45701
Filed May 26, 1987, Ser. No. 54,247
Term of patent 14 years
U.S. Cl. D2—250

312,916

SHOE UPPER

Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.

Filed Nov. 3, 1989, Ser. No. 431,139

Term of patent 14 years

U.S. Cl. D2—314

312,917

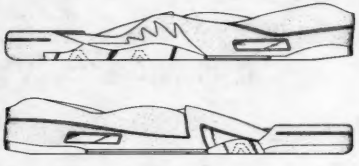
CUP SHAPED SOLE PERIPHERY

Tinker L. Hatfield, Portland, Oreg., assignor to Nike, Inc. and Nike International Ltd., both of Beaverton, Oreg.

Division of Ser. No. 407,020, Sep. 14, 1989. This application Nov. 21, 1989, Ser. No. 439,609

Term of patent 14 years

U.S. Cl. D2—314



312,918

SHOE SOLE FOOT FRAME

Michael A. Aveni, Lake Oswego, Oreg., assignor to Nike, Inc. and Nike International, Ltd., both of Beaverton, Oreg.

Filed Jun. 12, 1990, Ser. No. 536,451

Term of patent 14 years

U.S. Cl. D2—314

312,919

SIDE PANEL FOR A SHOE UPPER

Michael A. Aveni, Lake Oswego, Oreg., assignor to Nike, Inc. and Nike International, Ltd., both of Beaverton, Oreg.

Filed Jun. 12, 1990, Ser. No. 536,454

Term of patent 14 years

U.S. Cl. D2—314

312,920

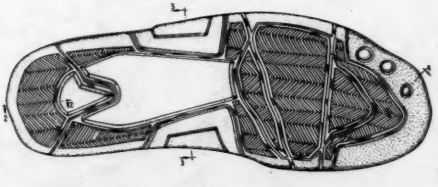
SHOE SOLE BOTTOM

Michael A. Aveni, Lake Oswego, Oreg., assignor to Nike, Inc. and Nike International, Ltd., both of Beaverton, Oreg.

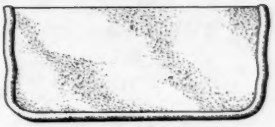
Filed Jun. 12, 1990, Ser. No. 536,452

Term of patent 14 years

U.S. Cl. D2—320

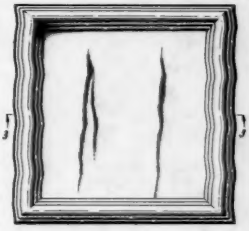


312,921
SEAT BELT PROTECTOR
Haehie Chang, Washington, D.C., assignor to Non Nu. Inc., Alexandria, Va.
Filed Nov. 9, 1987, Ser. No. 118,344
Term of patent 14 years
U.S. Cl. D2—639



312,922
HOLDER FOR EYEGLASSES
Lawrence Levy; Brian Folloder, both of Houston, Tex., and Glenn Konen, Ft. Collins, Colo., assignors to Expressions, Inc., Houston, Tex.
Filed Oct. 11, 1988, Ser. No. 256,299
Term of patent 14 years
U.S. Cl. D3—34

312,923
PICTURE FRAME
John G. Bleazard, P.O. Box 12191, Benoni 1504, South Africa
Filed Jun. 17, 1988, Ser. No. 208,279
Claims priority, application South Africa, Dec. 17, 1987, 87/1015
Term of patent 14 years
U.S. Cl. D6—300



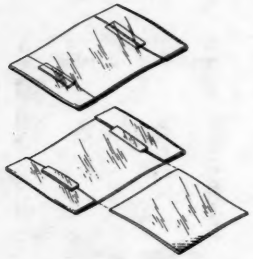
312,924
WALL-TYPE PHOTOGRAPH MOUNT
Tae-Yik Kim, Seoul, Rep. of Korea, assignor to Nae Wae Semi-Conductor Co., Ltd., Seoul, Rep. of Korea
Filed Apr. 11, 1988, Ser. No. 180,855
Claims priority, application Rep. of Korea, Dec. 31, 1987, 19909/1987[U]
Term of patent 14 years
U.S. Cl. D6—301

312,925

FRAME

Daniel J. Burhardt, Boulder, Colo., assignor to Structure Source Corporation, Boulder, Colo.

Filed May 9, 1988, Ser. No. 191,360
Term of patent 14 years
U.S. Cl. D6—314

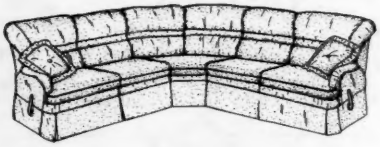


312,926

SECTIONAL SOFA

M. A. Gera, Glencoe, Ill., assignor to Universal Furniture Industries, Inc., High Point, N.C.

Filed Jan. 4, 1988, Ser. No. 140,426
Term of patent 14 years
U.S. Cl. D6—335

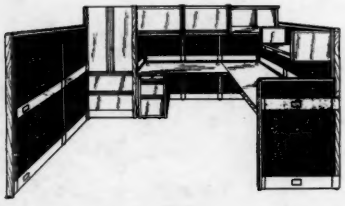


312,927

MODULAR OFFICE WORK STATION

Thomas J. Martin, Arnprior, and Bruce M. Macdonald, Ottawa, both of Canada, assignors to Tetrad Marketing/Sales Ltd., Canada

Continuation-in-part of Ser. No. 749,284, Jun. 27, 1985. This application Aug. 1, 1986, Ser. No. 892,054
Term of patent 14 years
U.S. Cl. D6—423

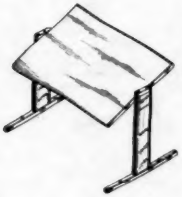


312,928

ADJUSTABLE TABLE

Adrianus J. M. Scheffers, Vught, Netherlands, assignor to Assenburg B.V., Tilburg, Netherlands

Filed Feb. 19, 1987, Ser. No. 16,233
Term of patent 14 years
U.S. Cl. D6—429

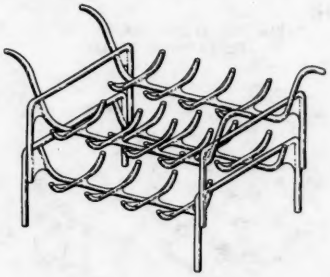


312,929

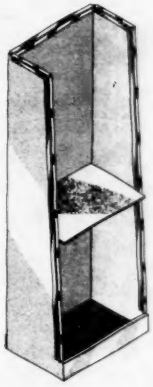
JEWELRY RACK

Clinton D. Nelson, North Chicago, Ill., assignor to C. D. Nelson Manufacturing Corporation, Lake Bluff, Ill.

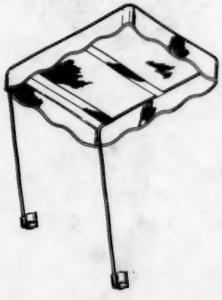
Filed Aug. 17, 1987, Ser. No. 86,659
Term of patent 14 years
U.S. Cl. D6—465



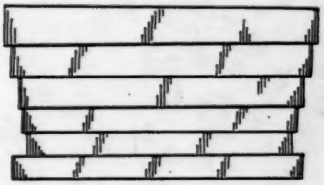
312,930
BEVERAGE CONTAINER DISPLAY STAND
Rafael T. Bustos, Alpharetta, Ga., assignor to Leggett & Platt, Incorporated, Carthage, Mo.
Filed Aug. 7, 1987, Ser. No. 83,413
Term of patent 14 years
U.S. Cl. D6—475



312,931
SUN SHADE FOR A LAWN CHAIR OR THE LIKE
William P. Westfall, and Beulah C. Westfall, both of Box 482, Coldwater, Ontario, Canada
Filed Feb. 5, 1988, Ser. No. 152,574
Claims priority, application Canada, Nov. 26, 1987, 26-11-87-1
Term of patent 14 years
U.S. Cl. D6—491

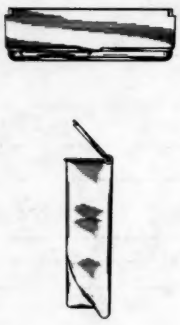


312,932
ADJUSTABLE TABLE BASE
James Congin, Solon, and William F. Meditz, Gates Mills, both of Ohio, assignors to Waygo, Inc., Cleveland, Ohio
Filed Feb. 24, 1987, Ser. No. 17,438
Term of patent 14 years
U.S. Cl. D6—496



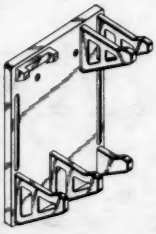
312,933
HEADREST FOR USE PRIMARILY IN A MOTOR VEHICLE
Dennis M. Lloyd, 1495 Chatham Sq. Apts., Gloucester, N.J.
Filed Oct. 19, 1987, Ser. No. 110,654
Term of patent 14 years
U.S. Cl. D6—502

312,934
COMBINED TISSUE DISPENSER AND TRASH RECEPTACLE
Orville C. Shapland, 1700 Lancaster, Big Spring, Tex. 79720, and Tom Guess, 4119 Dixon, Big Spring, Tex. 79721
Filed Sep. 1, 1989, Ser. No. 402,139
Term of patent 14 years
U.S. Cl. D6—519

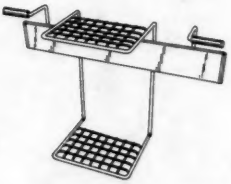


312,935
TOWEL BAR
John P. Chap, Lemont, and Dorothy Greenberg, Oak Park, both of Ill., assignors to Selfix, Inc., Chicago, Ill.
Filed Aug. 12, 1988, Ser. No. 231,237
Term of patent 14 years
U.S. Cl. D6—549

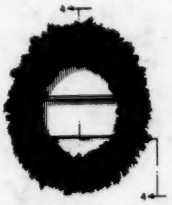
312,936
SKI RACK
P. David Lim, 5057 Cordoy La., San Jose, Calif. 95124
Filed Oct. 3, 1988, Ser. No. 252,450
Term of patent 14 years
U.S. Cl. D6—552



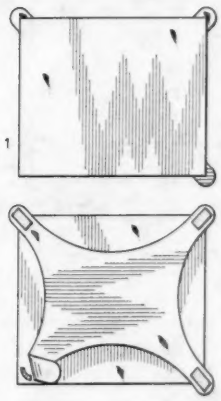
312,937
WALL MOUNTED GOLF EQUIPMENT STORAGE RACK
Steven W. Martinell, Vancouver, Wash., and Henry Y. Chin, Beaverton, Oreg., assignors to Racor, Inc., Portland, Oreg.
Filed Jan. 6, 1989, Ser. No. 294,205
Term of patent 14 years
U.S. Cl. D6—552



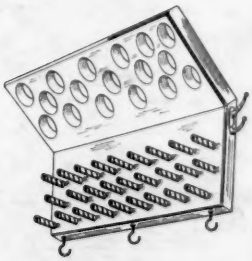
312,938
CHRISTMAS WREATH SHADOW BOX
Mary C. Guberman, c/o Kensington Designs, Inc., 11508 Applejack Ct., Cincinnati, Ohio 45241
Filed May 17, 1988, Ser. No. 194,770
Term of patent 14 years
U.S. Cl. D6—569



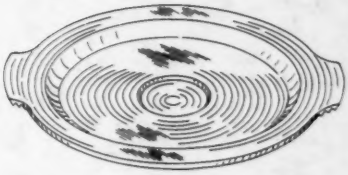
312,939
WATERBED SHEET SET
Keith E. Bigalk, 103 Market Box 232, Brownsdale, Minn. 55918
Filed Jun. 22, 1988, Ser. No. 209,799
Term of patent 14 years
U.S. Cl. D6—602



312,940
COMBINED HANDKERCHIEF, TIE AND BELT HOLDER
Marshall James, 97 James Rd., Lyman, S.C. 29365
Filed Nov. 25, 1988, Ser. No. 275,798
Term of patent 14 years
U.S. Cl. D6—571

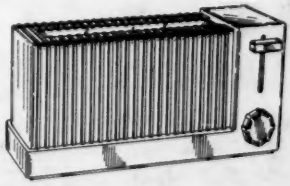


312,941
SERVING TRAY
Elliott N. Zivin, 8 Colony Rd., Westport, Conn. 06880
Filed Nov. 7, 1986, Ser. No. 929,148
Term of patent 14 years
U.S. Cl. D7—545

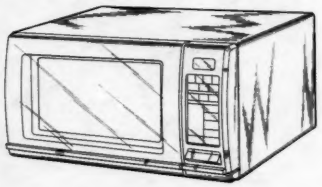


312,942
VACUUM JUG
Frank T. S. Huang, Room 804, 8th Fl., No. 598, Min Sheng E. Rd., Taipei, Taiwan
Filed Aug. 3, 1988, Ser. No. 228,210
Term of patent 14 years
U.S. Cl. D7—303

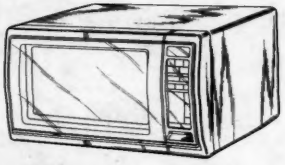
312,943
TOASTER
Maria G. Sanchez, Milan, Italy, assignor to Salton/Maxim Housewares Group, Mt. Prospect, Ill.
Filed Apr. 7, 1987, Ser. No. 35,693
Term of patent 14 years
U.S. Cl. D7—330



312,944
MICROWAVE OVEN
Masayoshi Kubo; Masuo Ichihara; Kensuke Mizuma, and Hisayoshi Matoba, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 10, 1988, Ser. No. 205,096
Claims priority, application Japan, Dec. 29, 1987, 62-53878
The portion of the term of this patent subsequent to Dec. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—351

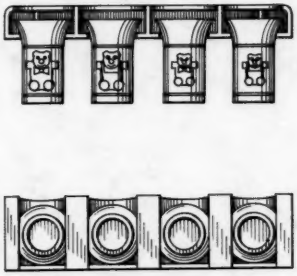


312,945
MICROWAVE OVEN
Masayoshi Kubo; Masuo Ichihara; Kensuke Mizuma, and Hisayoshi Matoba, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jun. 10, 1988, Ser. No. 205,097
Claims priority, application Japan, Dec. 29, 1987, 62-53879
The portion of the term of this patent subsequent to Dec. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—351

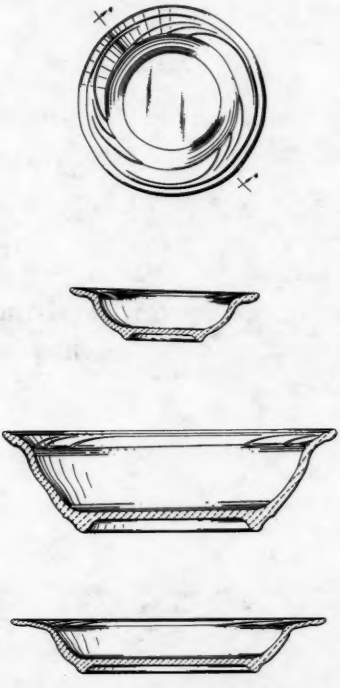


312,946
FOOD SUPPORT
E. David Schoen, 14256 Chestnut Dr., Eden Prairie, Minn. 55347
Filed Jul. 28, 1988, Ser. No. 225,143
Term of patent 14 years
U.S. Cl. D7—504

312,947
COMBINED TUMBLER RACK AND TUMBLERS
Nickie Kopanakis, and Chrisoula Kopanakis, both of 238 Benner St., Highland Park, N.J. 08904
Filed Feb. 8, 1988, Ser. No. 153,799
Term of patent 14 years
U.S. Cl. D7—507



312,948
BOWL OR SIMILAR ARTICLE
Steve A. Unger, Manilus, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Mar. 3, 1988, Ser. No. 163,409
Term of patent 14 years
U.S. Cl. D7—585

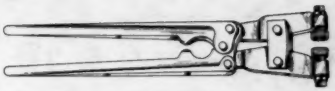


312,949
LOCKABLE CARRIER FOR BOTTLES, OR SIMILAR ARTICLE
Johannes Persch, Starnberg, Fed. Rep. of Germany, assignor to Pico Getranke GmbH, Starnberg, Fed. Rep. of Germany
Filed Aug. 4, 1988, Ser. No. 228,154
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1988, MR17902
Term of patent 14 years
U.S. Cl. D7—598

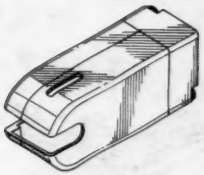
312,950
PASTRY PERFORATING TOOL
Yvonne J. Bell, 233 Central Ave., Newark, Ohio 43055
Filed Oct. 6, 1988, Ser. No. 253,729
Term of patent 14 years
U.S. Cl. D7—694

312,951
PLANT PROTECTOR
Andrea Forrest, R.D. 1 Box 377, St. Albans, Vt. 05478
Filed Nov. 21, 1988, Ser. No. 277,061
Term of patent 14 years
U.S. Cl. D8—1

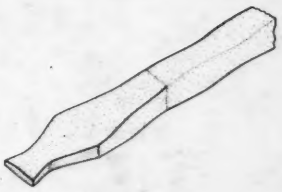
312,952
HAND TOOL FOR INSTALLING RIVETS ON CASTER WHEEL AXLES
Clair E. Berto, 20641 Lower Hillview Dr., Sonora, Calif. 95370
Filed Sep. 17, 1987, Ser. No. 97,930
Term of patent 14 years
U.S. Cl. D8—52



312,953
TUBE CUTTING TOOL
Jerald Vanderpol, Eldorado Hills, and Cory J. Silber, Sacramento, both of Calif., assignors to Tri Tool Inc., Rancho Cordova, Calif.
Filed Dec. 29, 1987, Ser. No. 139,057
Term of patent 14 years
U.S. Cl. D8—60



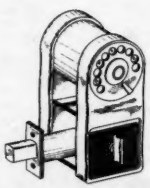
312,954
COMBINED SCREWDRIVER BIT AND SHEET METAL CUTTING ELEMENT FOR A COMBINATION HAND TOOL
John W. Wilbanks, 2362 Farley Rd., Birmingham, Ala. 35226
Filed Aug. 12, 1988, Ser. No. 231,248
The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—82



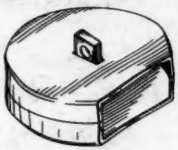
312,955
ENVELOPE OPENER
Sam Melamed, 2577 Elmhurst Dr., Beechwood, Ohio 44122
Filed Aug. 16, 1988, Ser. No. 233,079
Term of patent 14 years
U.S. Cl. D8—102

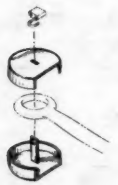
312,956
DOOR HANDLE
Cini Boeri, Via S. Ambrogio, 14-20123 Milan, Italy
Filed Feb. 24, 1988, Ser. No. 160,068
Claims priority, application Italy, Sep. 2, 1987, 22251/87[U]
Term of patent 14 years
U.S. Cl. D8—308

312,957
DOOR LOCK HAVING A CODE-SETTING DIAL
Yar-Shing Huang, No. 11-3, Lane 132, Jin An Rd., Chungho City, Taipei Hsien, Taiwan
Filed Sep. 23, 1988, Ser. No. 249,007
Term of patent 14 years
U.S. Cl. D8—341

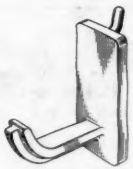


312,958
LUNETTE TRAILER HITCH ANTI-THEFT DEVICE
Tito M. Aguilar, Jr., 8804 Moye Dr., El Paso, Tex. 79925
Filed Aug. 12, 1988, Ser. No. 231,247
Term of patent 14 years
U.S. Cl. D8—346

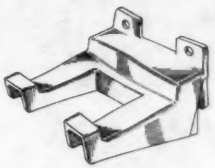


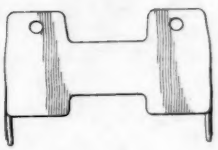


312,959
CURVED PEG HOOK
David L. Hamann, Cincinnati, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Jun. 29, 1988, Ser. No. 213,159
Term of patent 14 years
U.S. Cl. D8—367

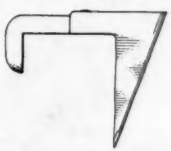


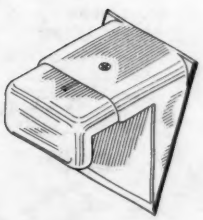
312,960
DOUBLE HOOK
Donald Embree, Copley, and David L. Hamann, Cincinnati, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 1, 1988, Ser. No. 226,751
Term of patent 14 years
U.S. Cl. D8—367



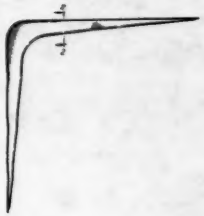


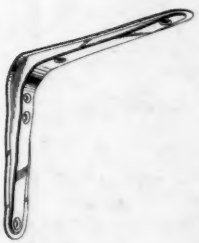
312,961
HANGER FOR USE WITH A PARTITION
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Jan. 20, 1987, Ser. No. 5,564
Term of patent 14 years
U.S. Cl. D8—373



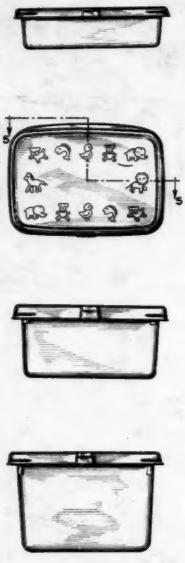


312,962
SHELF BRACKET
Kevin C. Overton, Maidstone, England, assignor to W. H. Overton Limited, Kent, England
Filed Jan. 11, 1988, Ser. No. 142,679
Claims priority, application United Kingdom, Jul. 8, 1987, 1043331
Term of patent 14 years
U.S. Cl. D8—381





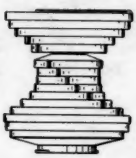
312,963
CONTAINER FOR PREMOISTENED SHEETS
Douglas R. Cleminshaw, Tully, and Paul A. Ranson, New York, Both of N.Y., assignors to Scott Paper Company, Philadelphia, Pa.
Filed Jun. 24, 1988, Ser. No. 211,530
Term of patent 14 years
U.S. Cl. D9—310



312,964
COMBINED BOTTLE AND CAP
Roland Carmine, Chatou, France, and Robert C. McFadyen, Wentworthville, Australia, assignors to Lever Brothers Company, New York, N.Y.
Filed Oct. 20, 1988, Ser. No. 260,556
Claims priority, application United Kingdom, Apr. 22, 1988, 1050194
Term of patent 14 years
U.S. Cl. D9—376

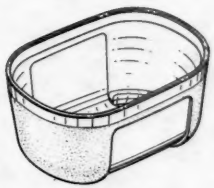
312,965
PERFUME BOTTLE
Serge Mansau, Paris, France, assignor to Beecham Fragrances S.A., Paris, France
Filed Oct. 31, 1988, Ser. No. 264,677
Claims priority, application France, Apr. 29, 1988, 882855
Term of patent 14 years
U.S. Cl. D9—377

312,966
PERFUME BOTTLE
Serge Mansau, Paris, France, assignor to Beecham Fragrances, Paris, France
Filed Oct. 31, 1988, Ser. No. 264,678
Claims priority, application France, Apr. 29, 1988, 882855
Term of patent 14 years
U.S. Cl. D9—384

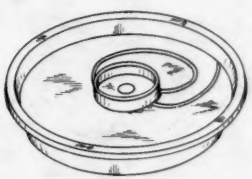


312,967
BOTTLE
Bethan M. Jones, Clwyd, Wales, assignor to CMB Foodcan plc, England
Filed Sep. 21, 1987, Ser. No. 99,845
Claims priority, application United Kingdom, Mar. 19, 1987, 1040876
Term of patent 14 years
U.S. Cl. D9—408

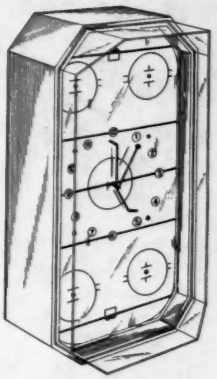
312,968
FOOD CONTAINER OR THE LIKE
Martin J. Wolff, North Providence, R.I., assignor to Dart Industries Inc., Deerfield, Ill.
Filed Nov. 18, 1988, Ser. No. 275,023
Term of patent 14 years
U.S. Cl. D9—431



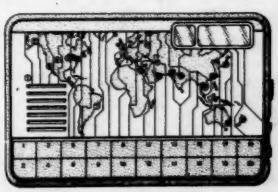
312,969
PULL TAB COVER
Lars-Erik Piltz, Konventsv. 3, Dalby, Sweden 240 10
Filed Aug. 16, 1988, Ser. No. 232,872
Claims priority, application Sweden, Feb. 16, 1988, 88-376
Term of patent 14 years
U.S. Cl. D9—438



312,970
CLOCK
David C. Richardson, 18 Cutting La., Burlington, Mass. 01803
Filed May 27, 1988, Ser. No. 199,579
Term of patent 14 years
U.S. Cl. D10—6



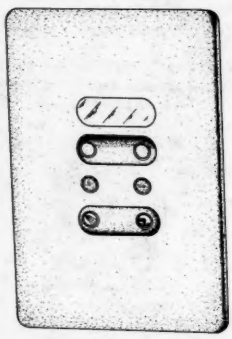
312,971
WORLD CLOCK
Asao Takashima, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Mar. 29, 1988, Ser. No. 175,122
Claims priority, application Japan, Nov. 19, 1987, 62-47398
Term of patent 14 years
U.S. Cl. D10—10



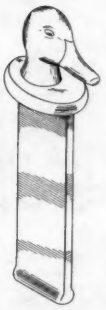
312,972
CLOCK
Seiji Odaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Aug. 7, 1987, Ser. No. 83,418
Claims priority, application Japan, Feb. 9, 1987, 62-4670
Term of patent 14 years
U.S. Cl. D10—28

312,973
WRISTWATCH
Benjamin E. Woomer, 1597 E. 30th St., Cleveland, Ohio 44114
Filed Aug. 26, 1987, Ser. No. 89,618
Term of patent 14 years
U.S. Cl. D10—39

312,974
FRONT PANEL FOR A WATER TEMPERATURE CONTROLLER
James M. Conner, Old Greenwich, Conn., and Jac K. Sperling, Boulder, Colo., assignors to Naiad Company, Boulder, Colo.
Filed Jun. 20, 1988, Ser. No. 209,548
Term of patent 14 years
U.S. Cl. D10—50



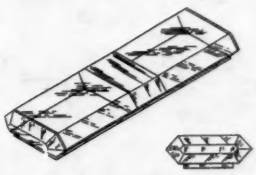
312,975
FLOATING THERMOMETER HOUSING
Stephen M. Scheurer, Wichita Falls, Tex., assignor to Texas Recreation Corporation, Wichita Falls, Tex.
Filed Feb. 9, 1988, Ser. No. 154,126
Term of patent 14 years
U.S. Cl. D10—57



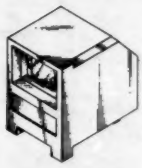
312,976
TAPE MEASURE
Siegfried Hölterscheidt, Hückelhoven, Fed. Rep. of Germany, assignor to Walter Henkels, GmbH, Fed. Rep. of Germany
Filed Mar. 21, 1988, Ser. No. 171,701
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, MR184
Term of patent 14 years
U.S. Cl. D10—72

312,977
TRAFFIC GUIDE POST
Heinrich Quante, Recklinghausen, Fed. Rep. of Germany, assignor to Armo Gesellschaft fur Bauelemente, Bau- und Wohnbedarf GmbH, Recklinghausen, Fed. Rep. of Germany
Filed May 27, 1988, Ser. No. 200,175
Claims priority, application Fed. Rep. of Germany, Nov. 30, 1987, DM/009768
Term of patent 14 years
U.S. Cl. D10—109

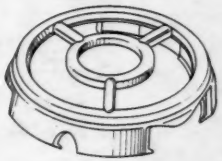
312,978
EMERGENCY LIGHT ENCLOSURE
Brian C. Foster, 3 Goleta Point Dr., Corona Del Mar, Calif. 92625
Filed Oct. 5, 1987, Ser. No. 104,665
Term of patent 14 years
U.S. Cl. D10—114



312,979
SURFACE MOUNTABLE LED INDICATOR LIGHT
Klaus Oesterheld, Middletown, N.J., and Carlos M. Martinez, Perkasie, Pa., assignors to North American Philips Corporation, New York, N.Y.
Filed Sep. 2, 1988, Ser. No. 240,024
Term of patent 14 years
U.S. Cl. D10—114



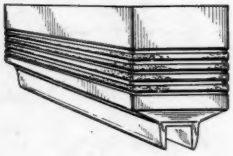
312,980
PROTECTOR FOR WRIST WATCH
Kazuyo Kawashima, Fussa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 11, 1987, Ser. No. 62,191
Term of patent 14 years
U.S. Cl. D10—132



312,981
CHARM BRACELET
Barbara Palmer, 104 Larne Ave., Richmond, Va. 23224
Filed Aug. 4, 1987, Ser. No. 81,161
Term of patent 14 years
U.S. Cl. D11—83

312,982
JEWELRY CLASP
Sundru Moodley, 610 S. Harrison, Littleton, Colo. 80122
Filed Jul. 10, 1987, Ser. No. 71,723
Term of patent 14 years
U.S. Cl. D11—87

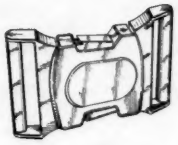
312,983
MODULAR PLANTER TROUGH
Alfred J. Powell, 1316 Vance Ave., Coraopolis, Pa. 15108
Filed Mar. 28, 1988, Ser. No. 174,611
Term of patent 14 years
U.S. Cl. D11—156



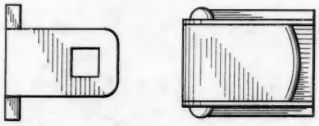
312,984
COLLAR STAY
Richard H. Sprick, R.R. #3, Box 105, Lake City, Minn. 55041
Filed Nov. 28, 1988, Ser. No. 277,043
Term of patent 14 years
U.S. Cl. D11—213

312,985
COLLAR STAY
Richard H. Sprick, R.R. #3, Box 105, Lake City, Minn. 55041
Filed Nov. 28, 1988, Ser. No. 277,044
Term of patent 14 years
U.S. Cl. D11—213

312,986
BUCKLE
John E. Bianchi, 100 Calle Cortez, Temecula, Calif. 92390
Filed Dec. 20, 1988, Ser. No. 286,701
Term of patent 14 years
U.S. Cl. D11—216

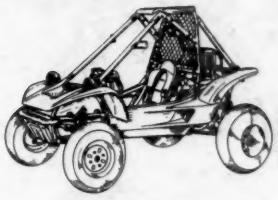


312,987
TRACTOR SEAT BELT HOLDER SET
Amiel Kuli, 1449 Berlin Rd., Wilmington, Ohio 45177
Filed Oct. 26, 1987, Ser. No. 112,764
Term of patent 14 years
U.S. Cl. D11—218



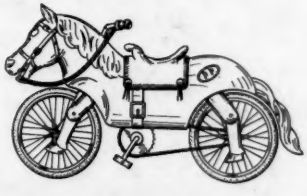
312,988
ZIPPER PULL
Harry G. Lazarus, Prospects Heights, Ill., and Christopher J. Conroy, Madison, Conn., assignors to E. R. Moore Co., Chicago, Ill.
Filed Sep. 26, 1988, Ser. No. 248,566
Term of patent 14 years
U.S. Cl. D11—221

312,989
FOUR WHEELED VEHICLE
Yutaka Murata, Fujimi; Kazuhiko Yokoyama, Kamifukuoka; Mutsumi Koshiishi, Tokyo; Akio Makita, Kawagoe, and Yasuharu Ishino, Fujimi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 21, 1988, Ser. No. 223,173
Term of patent 14 years
U.S. Cl. D12—87



312,990
TRAILER
Ronald D. Gerdes, Rte. 2, Box 149, Black River Falls, Wis. 54615
Filed Jul. 11, 1988, Ser. No. 217,752
Term of patent 14 years
U.S. Cl. D12—101

312,991
BICYCLE
Johnnie Lohrum, R.R. 2, Box 200, Osgood, Ind. 47037, and David C. Weber, R.R. 7, Box 110A, Greensburg, Ind. 47240
Filed Jun. 13, 1988, Ser. No. 205,904
Term of patent 14 years
U.S. Cl. D12—108



312,992
STRETCHER
Arno J. Liebman, deceased, late of 1819 Shore Dr. S., Shore View #218, South Pasadena, Fla. 33707 (Frank W. Goddard, legal representative)
Filed Sep. 23, 1988, Ser. No. 248,038
Term of patent 14 years
U.S. Cl. D12—128

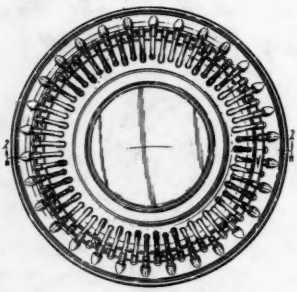
312,993
TIRE
Romano Guermandi, Milan, and Maurizio Boiocchi, Segrate, both of Italy, assignors to Pirelli Coordinamento Pneumatici S.p.A., Italy
Filed Oct. 20, 1987, Ser. No. 110,497
Claims priority, application Italy, May 8, 1987, 21555/87[U]
The portion of the term of this patent subsequent to Nov. 6, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—146

312,994
AUTOMOBILE TIRE
Toshio Hayakawa, and Tatsuro Shimada, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Oct. 19, 1988, Ser. No. 260,325
Claims priority, application Japan, May 27, 1988, 63-20685
Term of patent 14 years
U.S. Cl. D12—146

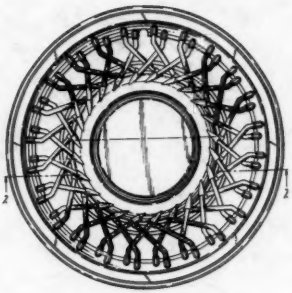
312,995
AUTOMOBILE TIRE
Kenji Tagashira, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Aug. 15, 1988, Ser. No. 232,379
Claims priority, application Japan, Feb. 17, 1988, 63-6420
Term of patent 14 years
U.S. Cl. D12—147

312,996
EXTERIOR SHELL OF A TRUNK DOOR OF A CAR TOP CARRIER OR SIMILAR ARTICLE
John B. Seaver, Elkhart, Ind., assignor to Seaco, Inc., Elkhart, Ind.
Filed Sep. 25, 1987, Ser. No. 101,273
Term of patent 14 years
U.S. Cl. D12—157

312,997
FRONT FACE OF A VEHICLE WHEEL COVER
Kenneth L. Carlson, Clawson, Mich., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Jun. 2, 1988, Ser. No. 203,375
Term of patent 14 years
U.S. Cl. D12—205

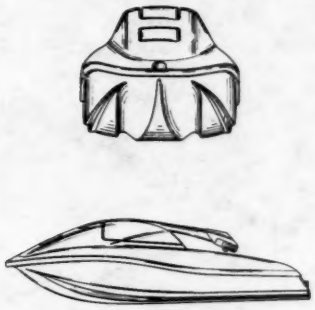


312,998
FRONT FACE OF A VEHICLE WHEEL COVER
Kenneth L. Carlson, Clawson, Mich., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Jun. 9, 1988, Ser. No. 204,490
Term of patent 14 years
U.S. Cl. D12—205

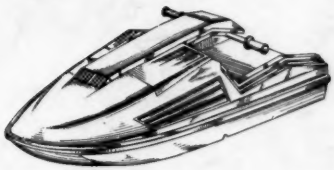


312,999
PUNCH BALL PADDLE
Wildon Dumaine, 11 Bay 46th St., Brooklyn, N.Y. 11214
Filed Jun. 6, 1988, Ser. No. 202,429
Term of patent 14 years
U.S. Cl. D21—213

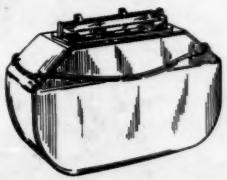
313,000
WATER CRAFT
Ronald H. Powers, Costa Mesa, Calif., assignor to Suzuki Jidohsa Kogyo Kabushiki Kaisha, Shizouka, Japan
Filed Jun. 29, 1988, Ser. No. 213,980
Term of patent 14 years
U.S. Cl. D12—307



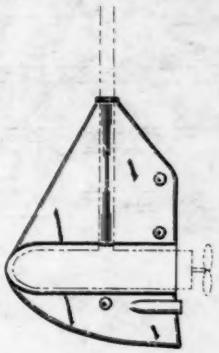
313,001
JET SKI
Albert A. Mardikian, 45 Goleta Point Dr., Corona del Mar, Calif. 92625
Filed Oct. 28, 1988, Ser. No. 264,178
Term of patent 14 years
U.S. Cl. D12—307



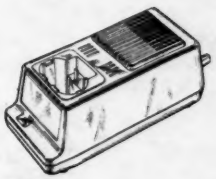
313,002
CANOE CONTAINER
James A. Henry, P.O. Box 363, Spring Hill, Waitsfield, Vt. 05673
Filed Jul. 19, 1988, Ser. No. 221,235
Term of patent 14 years
U.S. Cl. D12—317



313,003
ENCASING RUDDER FOR ELECTRIC TROLLING MOTOR
Alan Cain, P.O. Box 9318, Fort Worth, Tex. 76147
Filed Jul. 5, 1988, Ser. No. 215,886
Term of patent 14 years
U.S. Cl. D12—317

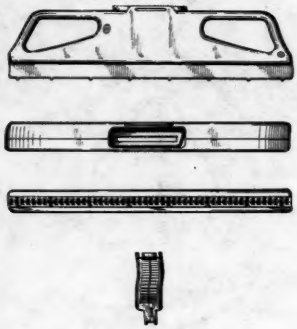


313,004
BATTERY CHARGER
Hideaki Hasegawa, Katsuta; Yoshio Iimura, Mito, and Kazuyuki Nagahara, Katsuta, all of Japan, assignors to Hitachi Koko Company, Ltd., Japan
Filed Aug. 9, 1988, Ser. No. 230,345
Term of patent 14 years
U.S. Cl. D13—108

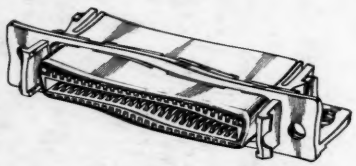


313,005
DECORATIVE LIGHT SOCKET
Eric Zimmerman, Los Angeles, Calif., assignor to Archigraphics, Huntington Park, Calif.
Filed Jul. 17, 1987, Ser. No. 74,460
Term of patent 14 years
U.S. Cl. D13—134

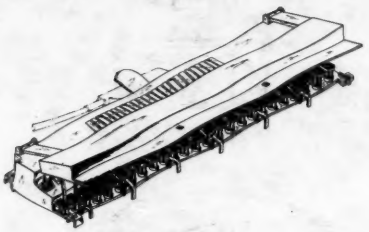
313,006
COMMUNICATIONS BLOCK CONNECTOR ADAPTER
John A. Siemon, Watertown, Conn., and Richard Early, San Diego, Calif., assignors to The Siemon Company, Watertown, Conn.
Filed May 13, 1987, Ser. No. 49,681
Term of patent 14 years
U.S. Cl. D13—147



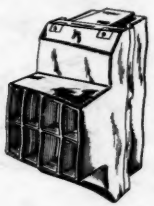
313,007
PRINTED-CIRCUIT BOARD CONNECTOR
Masaru Nakamura, Funabashi, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Nov. 13, 1987, Ser. No. 120,514
Claims priority, application Japan, May 18, 1987, 62-19459
Term of patent 14 years
U.S. Cl. D13—147



313,008
INTEGRAL MULTIPLE TRANSMISSION LINE INTERFACE TERMINAL
Joseph P. Bevacqua, Paterson; Thomas J. Collins, Wall Township, Monmouth County; Joseph J. Paddock, Jr., Kinnelon, and Robert E. Eastep, Walkerville, all of N.J., assignors to Bell Atlantic, Washington, D.C.
Filed Jan. 21, 1988, Ser. No. 146,386
Term of patent 14 years
U.S. Cl. D13—147



313,009
DUAL MODULAR JACK ADAPTER
John A. Siemon, Watertown, Conn., and Richard Early, San Diego, Calif., assignors to The Siemon Company, Watertown, Conn.
Filed Dec. 27, 1988, Ser. No. 290,097
Term of patent 14 years
U.S. Cl. D13—147



313,010
DUAL FUNCTION MARKING SLEEVE FOR ELECTRIC WIRES AND CABLES
Lars Skarin, Otterbacken, Sweden, assignor to Partex Fabriksaktiebolag, Gullspang, Sweden
Filed Nov. 2, 1988, Ser. No. 266,021
Claims priority, application Sweden, May 3, 1988, 88-1141
Term of patent 14 years
U.S. Cl. D13—157

313,011

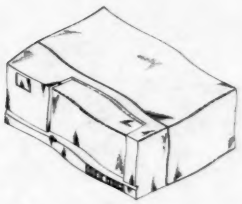
DATA CARTRIDGE BACKUP UNIT

Nathan H. Searle, Snohomisha; Jeffrey C. Brown, and Steve Kaneko, both of Seattle, all of Wash., assignors to Advanced Digital Information Corporation, Redmond, Wash.

Filed Apr. 13, 1989, Ser. No. 337,446

Term of patent 14 years

U.S. Cl. D14—100



313,012

CONTROL CONSOLE OR SIMILAR ARTICLE

Robert Pataki, Camberwell, and Carol Patsias, Mt. Waverley, both of Australia, assignors to L. M. Ericsson Pty. Ltd., Victoria, Australia

Filed Oct. 4, 1989, Ser. No. 416,939

Claims priority, application Australia, Apr. 4, 1989, 1042/89

Term of patent 14 years

U.S. Cl. D14—100

313,013

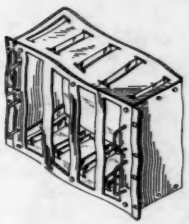
MULTIPLEXER BAY FOR DATA COMMUNICATION SYSTEMS

William D. Krietzman, Lancaster, Calif., assignor to Harris Corporation, Melbourne, Fla.

Filed Jul. 7, 1986, Ser. No. 882,669

Term of patent 14 years

U.S. Cl. D14—100



313,014

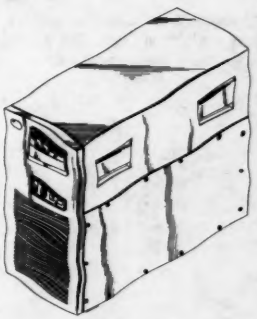
COMPUTER HOUSING OR THE LIKE

Jeffrey L. Kline, Austin, and Edward J. Sabella, Georgetown, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

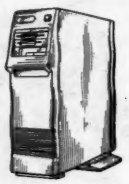
Filed Aug. 19, 1988, Ser. No. 234,446

Term of patent 14 years

U.S. Cl. D14—102



313,015
PERSONAL COMPUTER
Dean J. Ryan, Ventura, Calif.; Charles R. Lewis, Birmingham, Mich., and Donald S. Goodrich, The Woodlands, Tex., assignors to Compaq Computer Corporation, Houston, Tex.
Filed Dec. 29, 1988, Ser. No. 291,746
Term of patent 14 years
U.S. Cl. D14—102

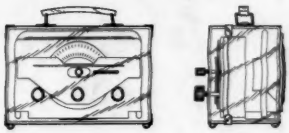


313,016
AUTOMATIC CARTRIDGE LOADER FOR MAGNETIC TAPE UNIT
Masami Watari; Makoto Tsuchida, and Masaru Ohshita, all of Kanagawa, Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Jul. 8, 1988, Ser. No. 218,592
Claims priority, application Japan, Feb. 3, 1988, 63-4031
Term of patent 14 years
U.S. Cl. D14—108

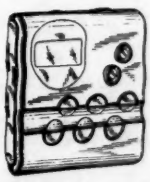
313,017
VIDEO CASSETTE RECORDER
Sa Y. Hong, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Oct. 5, 1988, Ser. No. 254,389
Claims priority, application Rep. of Korea, Apr. 12, 1988, 4925/1988
Term of patent 14 years
U.S. Cl. D14—135

313,018
COMPACT DISK PLAYER
Yukinobu Funabashi, Tokyo, Japan, assignor to CBM Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 14, 1988, Ser. No. 218,615
Term of patent 14 years
U.S. Cl. D14—156

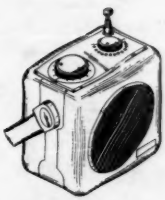
313,019
RADIO OR THE LIKE
Pierre-Yves Azuelos, Paris, France, assignor to PYM, Inc., New York, N.Y.
Filed Feb. 19, 1988, Ser. No. 158,159
Term of patent 14 years
U.S. Cl. D14—188



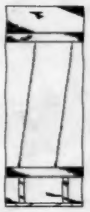
313,020
RADIO RECEIVER
Kazuo Ichikawa, Kokubunji, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 17, 1988, Ser. No. 195,015
Claims priority, application Japan, Nov. 17, 1987, 62-47046
Term of patent 14 years
U.S. Cl. D14—192



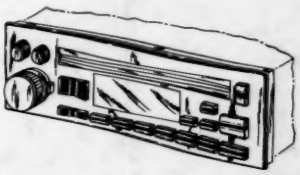
313,021
PORTABLE RADIO
Alexander Ehrmann, West Bloomfield, Mich., assignor to Alaron, Inc., Troy, Mich.
Filed Nov. 30, 1988, Ser. No. 278,082
Term of patent 14 years
U.S. Cl. D14—196



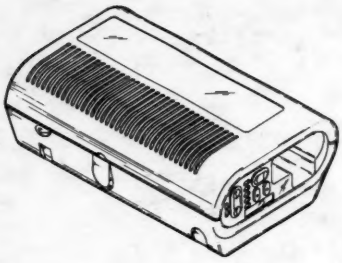
313,022
COMBINED LOUDSPEAKER CABINET, SOUND REFLECTOR AND SUPPORT BASE
Andrew E. Flanders, 570 N. 10th Ave., Cornelius, Oreg. 97113
Division of Ser. No. 66,796, Jun. 25, 1987. This application Apr. 9, 1990, Ser. No. 506,657
Term of patent 14 years
U.S. Cl. D14—214



313,023
FRONT CONTROL PANEL FOR A VEHICULAR COMPACT DISC PLAYER
David F. Kolenda, Livonia, and Kenneth H. Bloom, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Jun. 6, 1988, Ser. No. 203,026
Term of patent 14 years
U.S. Cl. D14—258



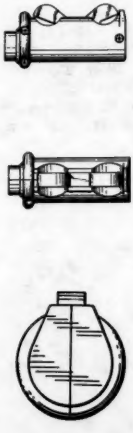
313,024
VEHICULAR ADAPTOR FOR A PORTABLE RADIO
Scott H. Richards, Sunrise; Bruce A. Claxton, Coral Springs, and Rudy Yorio, Sunrise, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Jul. 18, 1988, Ser. No. 220,846
Term of patent 14 years
U.S. Cl. D14—265



313,025
COMBINED PLACER MINING SUCTION NOZZLE AND PUDDLING NOZZLE
Vernon A. East, 915 W. 16th St., Tempe, Ariz. 85281
Filed Jun. 27, 1988, Ser. No. 211,662
Term of patent 14 years
U.S. Cl. D15—21

313,026
PORTABLE REFRIGERATOR
Graeme R. Evans, Ashmore, Australia, assignor to Singleton Industries Pty. Ltd., Queensland, Australia
Filed Jun. 28, 1988, Ser. No. 212,728
Term of patent 14 years
U.S. Cl. D15—83

313,027
JOYSTICK HANDLE FOR ELECTRICAL-HYDRAULIC CONTROL SYSTEMS
Mats A. Persson, Ljung, and Jan E. Tranlov, Boras, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden
Filed Sep. 30, 1987, Ser. No. 103,259
Claims priority, application Sweden, Mar. 31, 1987, 87-0724
Term of patent 14 years
U.S. Cl. D15—142



313,028

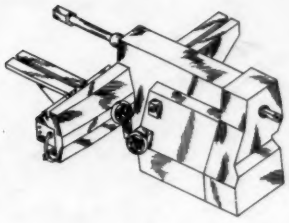
LATHE

Leo C. Bogaerts, Antioch; John W. Murphy, and John S. Norman, both of Waukegan, all of, assignors to Ammco Tools, Inc., North Chicago, Ill.

Filed Jul. 21, 1988, Ser. No. 222,239

Term of patent 14 years

U.S. Cl. D15—130



313,029

BINOCULARS

Choon J. Lee, Seoul, Rep. of Korea, assignor to Daeyang Optical Co., Ltd., Daejeon, Rep. of Korea

Filed Dec. 12, 1988, Ser. No. 283,521

Term of patent 14 years

U.S. Cl. D16—133

313,030

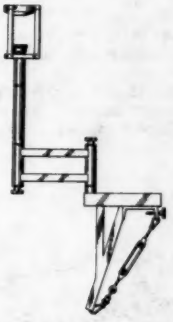
CAMERA MOUNT

Jeffrey D. Morton, P.O. Box 61, Castaic, Calif. 91310

Filed Dec. 2, 1987, Ser. No. 128,472

Term of patent 14 years

U.S. Cl. D16—242



313,031

ELECTRONIC KEYBOARD MUSICAL INSTRUMENT

Yasuo Yamawaki, Shizuoka, Japan, assignor to Yamaha Corporation, Japan

Filed Jun. 13, 1988, Ser. No. 206,327

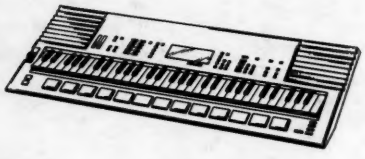
Claims priority, application Japan, Dec. 10, 1987, 62-50519

Term of patent 14 years

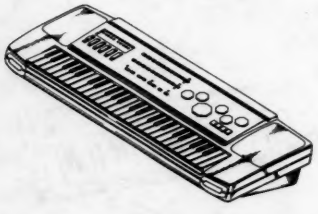
U.S. Cl. D17—1

313,032
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT
Eizo Amiya, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan
Filed Jun. 13, 1988, Ser. No. 206,329
Term of patent 14 years
U.S. Cl. D17—1

313,033
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT
Kazuyuki Mizushima, Hamamatsu, Japan, assignor to Yamaha Corp., Japan
Filed Jun. 13, 1988, Ser. No. 206,330
Claims priority, application Japan, Dec. 10, 1987, 62-50521
Term of patent 14 years
U.S. Cl. D17—1



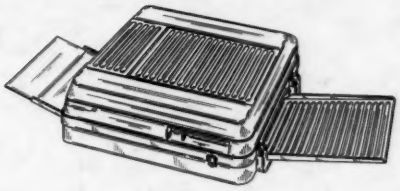
313,034
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT
Masaki Koide, Kunitachi, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Aug. 11, 1988, Ser. No. 231,542
Term of patent 14 years
U.S. Cl. D17—1



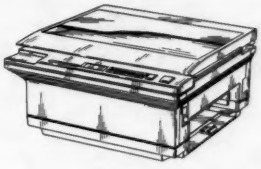
313,035
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT
Tatsuo Katsuhara, Hachioji, and Shigeru Kitsuyu, Kunitachi, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan
Filed Aug. 24, 1988, Ser. No. 236,117
Term of patent 14 years
U.S. Cl. D17—1

313,036
GUITAR HEAD
David G. Wintz, 4914 Dickson, Unit B, Houston, Tex. 77007
Filed Dec. 18, 1987, Ser. No. 134,909
Term of patent 14 years
U.S. Cl. D17—20

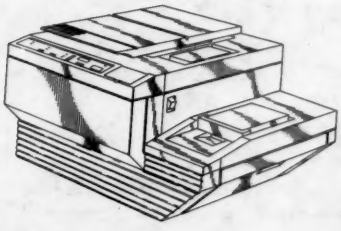
313,037
PORTABLE COPYING MACHINE
Mikio Kosako, and Yoichio Tatsuta, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 27, 1988, Ser. No. 211,843
Claims priority, application Japan, Dec. 28, 1987, 62-53496
Term of patent 14 years
U.S. Cl. D18—36



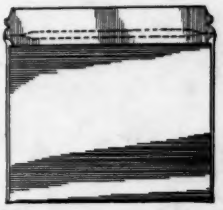
313,038
ELECTRONIC COPYING MACHINE
Kunio Hara, Chiba, and Atsushi Tani, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Oct. 31, 1988, Ser. No. 264,671
Claims priority, application Japan, Jul. 5, 1988, 63-26512
Term of patent 14 years
U.S. Cl. D18—36

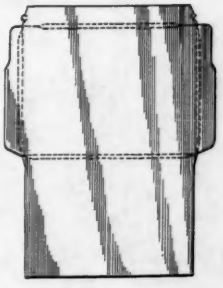


313,039
COPIER OR SIMILAR ARTICLE
Masanori Hashimoto, Hills Terao 2-308, 4-24 Nishi Terao, Kanagawa-Ku, Yokohama, Kanagawa-Ken, Japan
Filed Jan. 11, 1988, Ser. No. 141,907
Claims priority, application Japan, Jul. 10, 1987, 62-28212
Term of patent 14 years
U.S. Cl. D18—37



313,040
ENVELOPE
Hampton E. Forbes, Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 760,602, Jul. 30, 1985, abandoned. This application Mar. 2, 1988, Ser. No. 166,789
Term of patent 14 years
U.S. Cl. D19—3

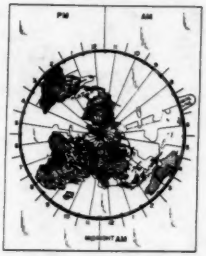




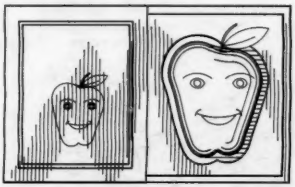
313,041
BALL-POINT PEN
Suk J. Kim, Seoul, Rep. of Korea; Atsushi Deguchi, Tokyo, and Sadao Yoshinaga, Ichikawa, both of Japan, assignors to Yoshinaga Prince Company Limited, Tokyo, Japan
Filed Feb. 26, 1987, Ser. No. 19,494
Claims priority, application Japan, Aug. 29, 1986, 61-33886
Term of patent 14 years
U.S. Cl. D19—42

313,042
WRITING INSTRUMENT
Fernando Lecce, Settimo Torinese, Italy, assignor to Lecce Pen Company, S.r.l., Turin, Italy
Filed Jul. 2, 1987, Ser. No. 69,577
Claims priority, application Italy, Jan. 5, 1987, 20409/87[U]
The portion of the term of this patent subsequent to Mar. 6, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—48

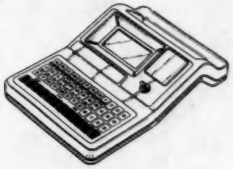
313,043
DIAL FOR WORLD TIME ZONES
Svetislav M. Radosavljevic, 10406 S. Hamilton, Chicago, Ill. 60643
Filed Dec. 21, 1987, Ser. No. 135,745
Term of patent 14 years
U.S. Cl. D19—59



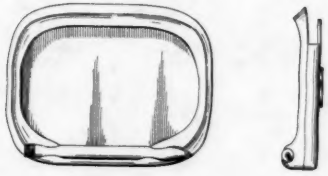
313,044
COMBINATION DOLL AND BOOK
Michael J. Spak, 3 Fern Pl., Milltown, N.J. 08850
Filed Mar. 14, 1988, Ser. No. 167,446
Term of patent 14 years
U.S. Cl. D19—59



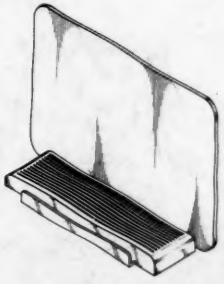
313,045
ELECTRONIC EDUCATIONAL GAME
Tsuneo Hanzawa, Tokyo, Japan, assignor to Kabushiki Kaisa Hanzawa Corporation, Tokyo, Japan
Filed Feb. 22, 1988, Ser. No. 159,057
Term of patent 14 years
U.S. Cl. D19—60



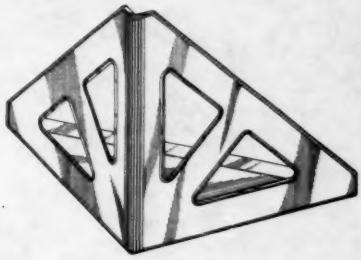
313,046
COMBINED HOLDER FOR A NOTEPAD AND WRITING INSTRUMENT
Victor Colani, Norderstedt, Fed. Rep. of Germany, assignor to Bonatrade International, Inc., Santa Ana, Calif.
Filed Dec. 30, 1987, Ser. No. 139,428
Term of patent 14 years
U.S. Cl. D19—78



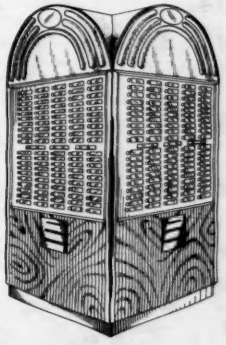
313,047
VERTICAL FILE MODULE
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Oct. 15, 1987, Ser. No. 108,974
Term of patent 14 years
U.S. Cl. D19—99



313,048
BOOKEND
Kent W. Murphy, Wooster; Charles W. Craft, Jr., Apple Creek, and Bob Mervar, Columbus, all of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Oct. 3, 1988, Ser. No. 251,867
Term of patent 14 years
U.S. Cl. D19—34.1

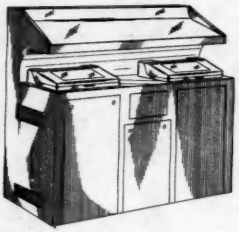


313,049
COUPON DISPENSER
Patrick J. Kennedy, 4827 Whirlwind, San Antonio, Tex. 78217
Filed Mar. 4, 1987, Ser. No. 21,424
Term of patent 14 years
U.S. Cl. D20—2



313,050
FOOD AND BEVERAGE MENU HOLDER FOR RESTAURANT TABLES OR THE LIKE
Karen E. Burgess, Branford, Conn., assignor to Gastro-Gnomes, Inc., West Hartford, Conn.
Filed Mar. 13, 1990, Ser. No. 492,874
Term of patent 14 years
U.S. Cl. D20—40

313,051
COMBINED RANDOM NUMBER ELECTRONIC GAMING AND COUPON DISPENSING MACHINE
Floyd H. Haker, 6546 Linden Ave., Dallas, Tex. 75230
Filed Aug. 18, 1987, Ser. No. 86,727
Term of patent 14 years
U.S. Cl. D21—37



313,052
HUMAN FIGURE GAME DIE
Peter Hendrikx, Dusseldorf, Fed. Rep. of Germany, assignor to C.C. Creative Consulating, S.A., Kronbuhl, Switzerland
Filed Apr. 28, 1988, Ser. No. 188,785
Claims priority, application Fed. Rep. of Germany, Nov. 4, 1987, URA1558/87
Term of patent 14 years
U.S. Cl. D21—41

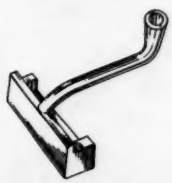
313,053
DOLL
Victoria McCharen, 699 Helen Dr., Hollister, Calif. 95023
Filed Dec. 14, 1987, Ser. No. 132,140
Term of patent 14 years
U.S. Cl. D21—171

313,054
DOLL
Victoria McCharen, 699 Helen Dr., Hollister, Calif. 95023
Filed Dec. 14, 1987, Ser. No. 132,139
Term of patent 14 years
U.S. Cl. D21—171

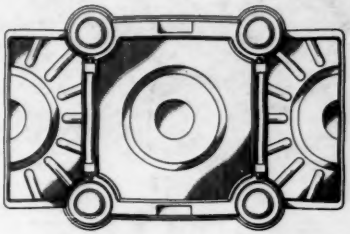
313,055
EXERCISE CYCLE CONSOLE
Scott R. Watterson, River Heights, Utah, assignor to Proform Fitness Products, Inc., Logan, Utah
Division of Ser. No. 857,539, Apr. 17, 1986. This application Mar. 21, 1989, Ser. No. 341,672
Term of patent 14 years
U.S. Cl. D21—194

313,056
GOLF CLUB HEAD
Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204
Filed May 8, 1987, Ser. No. 47,281
The portion of the term of this patent subsequent to Mar. 28, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D21—217

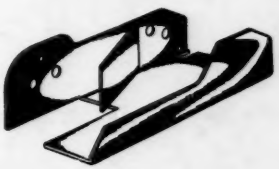
313,057
GOLF PUTTER HEAD
Frank H. Gebhardt, 530 Middle Rd., Kalispell, Mont. 59901
Filed Feb. 29, 1988, Ser. No. 161,831
Term of patent 14 years
U.S. Cl. D21—217



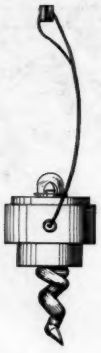
313,058
SAND BOX
Stephen D. Wehmeyer, West Falls, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Aug. 15, 1988, Ser. No. 232,575
Term of patent 14 years
U.S. Cl. D21—252



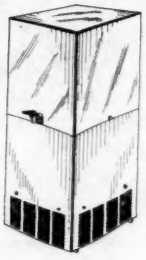
313,059
ARCHERY OVERDRAW
Benny Sears, Rte. 2, Cleveland, Ga. 30528
Filed Dec. 30, 1988, Ser. No. 291,996
Term of patent 14 years
U.S. Cl. D22—107



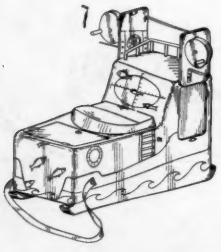
313,060
NIGHT FISHING ALARM
Jimmy E. Alexander, and David A. Alexander, both of Rte. 1, Box 119 AA, Port Lavaca, Tex. 77979
Filed May 18, 1988, Ser. No. 195,177
Term of patent 14 years
U.S. Cl. D22—134



313,062
WATER DISTILLING APPARATUS
David G. Palmer, Lincoln, Nebr., assignor to International Water Technologies, Inc., Lincoln, Nebr.
Filed Feb. 16, 1990, Ser. No. 481,468
Term of patent 14 years
U.S. Cl. D23—207



313,061
PORTABLE, COLLAPSIBLE ICE FISHING SLED
Charles Bascom, and Betty Bascom, both of Box 37, R.R. #1 Thumm Rd., Elmira, Mich. 49730
Filed Jan. 5, 1989, Ser. No. 294,257
Term of patent 14 years
U.S. Cl. D22—134



313,063

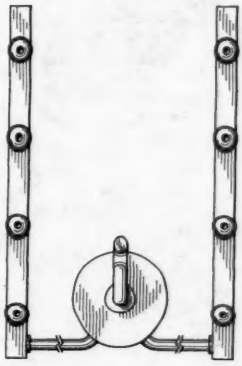
SHOWER HEAD WITH MULTIPLE NOZZLES

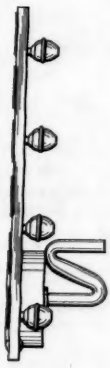
Karel Sroubek, 2321 S. 13th Ave., N. Riverside, Ill. 60546

Filed Dec. 18, 1987, Ser. No. 134,908

Term of patent 14 years

U.S. Cl. D23—213





313,064

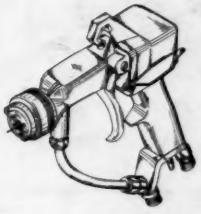
ELECTROSTATIC SPRAY GUN

Robert J. Lind, Robbinsdale; Stanley G. Karwoski, Oakdale; Lawrence J. Lunzer, St. Louis Park, all of Minn., and Alexander Bally, Pittsburgh, Pa., assignors to Graco Inc., Minneapolis, Minn.

Filed Aug. 24, 1988, Ser. No. 235,636

Term of patent 14 years

U.S. Cl. D23—226



313,065

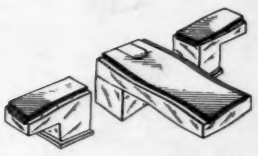
FAUCET SET

Joseph Strignano, New York, N.Y., assignor to I. W. Industries, Inc., Melville, N.Y.

Division of Ser. No. 39,635, Apr. 16, 1987, Pat. No. Des. 308,718. This application Feb. 8, 1990, Ser. No. 477,213

Term of patent 14 years

U.S. Cl. D23—242



313,066

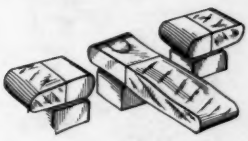
FAUCET SET

Joseph Strignano, New York, N.Y., assignor to I. W. Industries, Inc., Melville, N.Y.

Division of Ser. No. 39,650, Apr. 16, 1987, Pat. No. Des. 310,864. This application Feb. 8, 1990, Ser. No. 477,218

Term of patent 14 years

U.S. Cl. D23—242



313,067

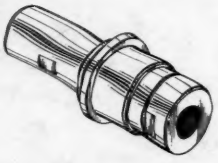
QUICK RELEASE COUPLING

Naoyuki Kotake, and Toshio Mikiya, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,974

Term of patent 14 years

U.S. Cl. D23—262



313,068

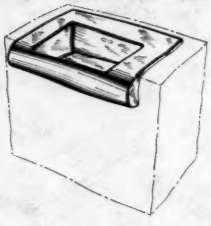
SINK

Herbert V. Kohler, Jr., Kohler, and Mary J. Reid, Sheboygan, both of Wis., assignors to Kohler Co., Kohler, Wis.

Filed Jan. 12, 1988, Ser. No. 144,431

Term of patent 14 years

U.S. Cl. D23—294



313,069

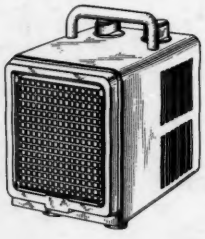
ELECTRICAL HEATER

David D. McCormick, Shawnee Mission, Kans., assignor to Rival Manufacturing Company, Kansas City, Mo.

Filed Dec. 22, 1988, Ser. No. 290,083

Term of patent 14 years

U.S. Cl. D23—335



313,070

STOVE

Jeffrey P. Greene, West Kingston, R.I., assignor to Nu-Tec Incorporated, East Greenwich, R.I.

Filed Mar. 17, 1988, Ser. No. 169,339

Term of patent 14 years

U.S. Cl. D23—346

313,071

AIR PURIFIER AND IONIZER

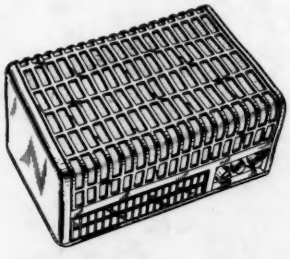
Fernand Scherrer, Massagno, Switzerland, assignor to Periso S.A., Isone, Switzerland

Filed Aug. 11, 1987, Ser. No. 84,505

Claims priority, application Switzerland, Feb. 11, 1987, 115879

Term of patent 14 years

U.S. Cl. D23—364



313,072

ELECTRIC HEATER ELEMENT FOR USE IN A RADIANT HEATER FOR A GLASS CERAMIC HOB

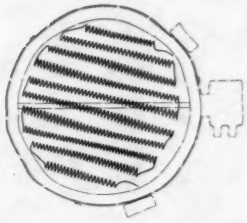
Alan W. Welsh, Peterborough, and Trevor W. Cheetham, Huntingdon, both of England, assignors to Redring Electric Limited, England

Filed Aug. 10, 1988, Ser. No. 230,857

Claims priority, application United Kingdom, Feb. 10, 1988, 1048430

Term of patent 14 years

U.S. Cl. D23—417



313,073

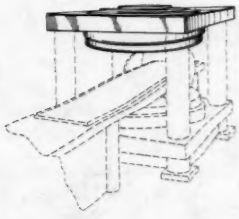
MAGNETIC RESONANCE IMAGING MAGNET HOUSING

Leon Kaufman, San Francisco, and Colin B. Kennedy, Mill Valley, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Oct. 28, 1987, Ser. No. 113,725

Term of patent 14 years

U.S. Cl. D24—2



313,074

ULTRASONIC ASPIRATOR FOR MICROSCOPE NEUROSURGERY

Masaichi Kijima, Tokyo, and Nobumichi Yajima, Nagano, both of Japan, assignors to Aloka Co., Ltd., Tokyo and Ueda Japan Radio Co., Ltd., Nagano, both of, Japan

Filed Dec. 29, 1987, Ser. No. 139,692

Claims priority, application Japan, Jul. 29, 1987, 62-30965

Term of patent 14 years

U.S. Cl. D24—26

313,075

BABY FEEDING BOTTLE

John V. Mariol, Cincinnati, Ohio, assignor to James F. Mariol, Cincinnati, Ohio

Filed Jan. 14, 1988, Ser. No. 144,398

Term of pateat 14 years

U.S. Cl. D24—47

313,076

DIAPER

Ronald D. Harju, 38357 Loyala St., Waukegan, Ill. 60087

Filed Dec. 9, 1988, Ser. No. 281,692

Term of patent 14 years

U.S. Cl. D24—50

313,077

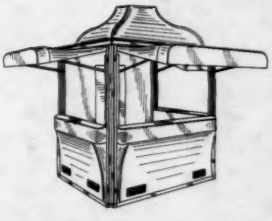
KIOSK

Tomás. C. Miñarro, Premia de Mar, Spain, assignor to Disenos y Representaciones, S.A., Premia de Mar, Spain

Filed May 12, 1988, Ser. No. 193,591

Term of patent 14 years

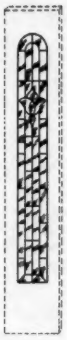
U.S. Cl. D25—16



313,078
FRAME MEMBER
David M. Rinehart, Lawrenceville, Ga., assignor to Kawneer Company, Inc., Norcross, Ga.
Division of Ser. No. 60,367, Jun. 9, 1987. This application Sep. 15, 1989, Ser. No. 407,891
The portion of the term of this patent subsequent to Mar. 6, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—60

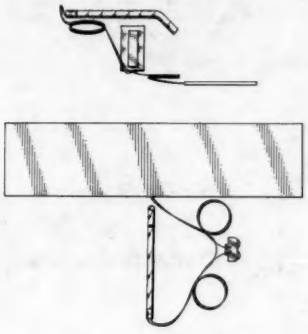
313,079
DOOR LIGHT PANEL
Roger C. Hall, Jasper, Tex., assignor to VISADOR Company, Jasper, Tex.
Filed Sep. 23, 1988, Ser. No. 248,206
Term of patent 14 years
U.S. Cl. D25—103

313,080
DOOR LIGHT PANEL
Roger C. Hall, Jasper, Tex., assignor to VISADOR Company, Jasper, Tex.
Filed Sep. 23, 1988, Ser. No. 248,210
Term of patent 14 years
U.S. Cl. D25—103

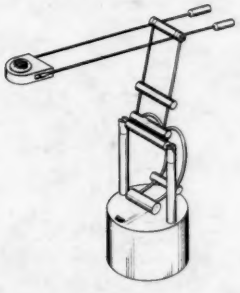


313,081
DOOR LIGHT PANEL
Roger C. Hall, Jasper, Tex., assignor to Visador Company, Jasper, Tex.
Filed Sep. 23, 1988, Ser. No. 248,211
Term of patent 14 years
U.S. Cl. D25—103

313,082
BATTERY-POWERED NIGHT LIGHT WITH FOOT-OPERATED PRESSURE SWITCH PAD FOR A COMMODE
James W. Clarkson, Jr., 1018 Brinton Ave., Banning, Calif. 92220
Filed Jul. 20, 1987, Ser. No. 75,081
Term of patent 14 years
U.S. Cl. D26—24



313,083
ADJUSTABLE LAMP
Soddy Huang, 2F, No. 31, Lane 57, Tung Shun St., Shulin Taipei Hsien, Taiwan
Filed Jul. 8, 1988, Ser. No. 216,641
Term of patent 14 years
U.S. Cl. D26—65



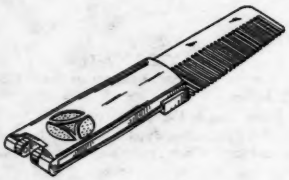
313,084
FLASHLIGHT END CAP
Richard A. Bramble, Encinitas, Calif., assignor to Barrel Service Company, San Marcos, Calif.
Filed Nov. 23, 1987, Ser. No. 123,977
Term of patent 14 years
U.S. Cl. D26—113

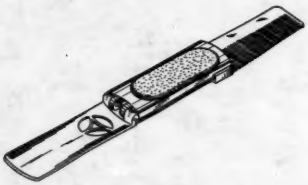
313,085
COMBINED CIGARETTE LIGHTER AND CLIP
Kenneth D. Eisenbraun, 256 Executive Dr., Troy, Mich. 48083
Filed Sep. 21, 1987, Ser. No. 98,676
Term of patent 14 years
U.S. Cl. D27—142

313,086
CIGARETTE LIGHTER
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan
Filed May 6, 1988, Ser. No. 190,307
Claims priority, application Japan, Nov. 12, 1987, 62-45925
The portion of the term of this patent subsequent to Jan. 9, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D27—156

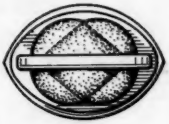
313,087
COMBINED HAIR COLORING APPLICATION BOTTLE AND TIMER
Robert Bloom, 425 Ascot La., Streamwood, Ill. 60103
Filed Sep. 13, 1988, Ser. No. 243,939
Term of patent 14 years
U.S. Cl. D28—20

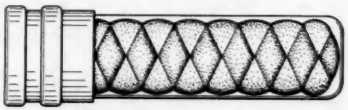
313,088
COMPACT COMB, LINT BRUSH AND SHOE HORN ASSEMBLY
Ming-Long Her, No. 24, Alley 3, Lane 42, Sec. 2, Hsiang Shang Rd., Taichung, Taiwan
Filed Sep. 8, 1988, Ser. No. 241,562
Term of patent 14 years
U.S. Cl. D28—25



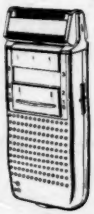


313,089
CURLING IRON COVER
Jean I. Schuler, 6001 Netherton St., Centerville, Va. 22020
Filed Mar. 22, 1989, Ser. No. 327,146
Term of patent 14 years
U.S. Cl. D28—38





313,090
ELECTRIC DRY SHAVER
Roland Ullmann, Offenbach-Rumpenheim, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany
Filed Nov. 16, 1987, Ser. No. 121,774
Claims priority, application Fed. Rep. of Germany, May 27, 1987, 73 MR 9586
Term of patent 14 years
U.S. Cl. D28—49



313,091

DENTAL FLOSS APPLICATOR

Ming-Chuan Kuo, 19350 Christina Ct., Cerritos, Calif. 90701

Filed Nov. 14, 1988, Ser. No. 271,071

Term of patent 14 years

U.S. Cl. D28—64

313,092

EAR MUFF

Ake E. Nilsson, Domaregatan 6 A, S-252 59 Helsingborg, Sweden

Filed Jul. 13, 1988, Ser. No. 218,931

Claims priority, application Sweden, Feb. 19, 1988, 88-0428

Term of patent 14 years

U.S. Cl. D29—17

Fig. 1

313,093

AUTOMATIC FOOD DISPENSER FOR AQUARIUMS OR THE LIKE

Mamoru Tanaka, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan

Filed Aug. 3, 1989, Ser. No. 389,104

Claims priority, application Japan, Feb. 8, 1989, 1-4449

Term of patent 14 years

U.S. Cl. D30—122

313,094

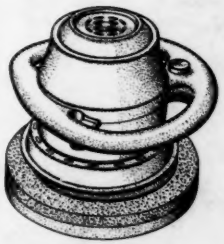
AUTOMOBILE CLEANING AND WAXING TOOL

Sam S. Itaya, Pasadena, and Robert E. Burglin, Orange, both of Calif., assignors to Waxing Corporation of America, Inc., Orange, Calif.

Filed May 22, 1987, Ser. No. 53,942

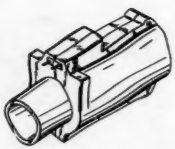
Term of patent 14 years

U.S. Cl. D32—19

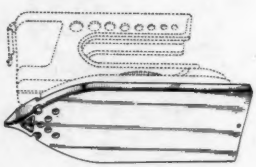


313,095
POWER CARPET CLEANER
Bonifacio Avecilla, Alhambra, and Paul G. Jacobs, Northridge, both of Calif., assignors to EDIC, Los Angeles, Calif.
Filed May 20, 1988, Ser. No. 196,966
Term of patent 14 years
U.S. Cl. D32—22

313,096
VACUUM HOSE HANDLE FOR A CENTRAL VACUUM SYSTEM
Theodore R. Hayden, 10291 Springhill Crescent, Richmond, British Columbia V7E 1W7, Canada
Filed Aug. 1, 1988, Ser. No. 226,987
Term of patent 14 years
U.S. Cl. D32—34

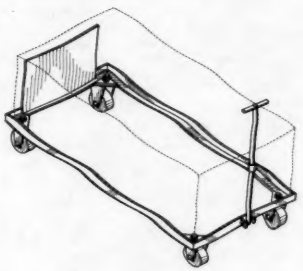


313,097
STEAM IRON SOLE PLATE FOR SEAM OPENING OR SIMILAR ARTICLE
Donald R. Davidson, Chatham; Gerald J. Creed, Rahway, and Howard D. Rogers, Fanwood, all of N.J., assignors to SSMC Inc., Edison, N.J.
Filed Sep. 23, 1988, Ser. No. 248,202
Term of patent 14 years
U.S. Cl. D32—71

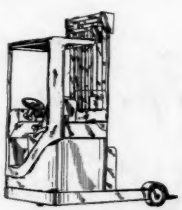


313,098
POCKET SPITOON
Monty Boyd, Rte. #2, Box 652, Muldrow, Okla. 74948
Filed Feb. 17, 1988, Ser. No. 156,558
Term of patent 14 years
U.S. Cl. D34—2

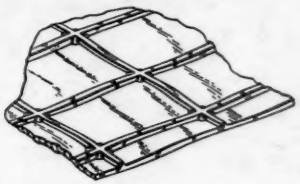
313,099
PICNIC COOLER CARRIER
Rickey Tasley, 5901 Griggs Dr., Flint, Mich. 48504
Filed Jun. 22, 1988, Ser. No. 209,788
Term of patent 14 years
U.S. Cl. D34—17



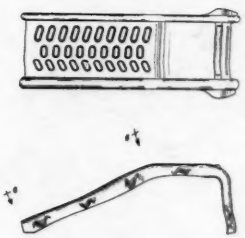
313,100
FORK LIFT
Richard Soederberg, Muehlacker, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany
Filed Feb. 26, 1988, Ser. No. 163,399
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, MR 6300
Term of patent 14 years
U.S. Cl. D34—28



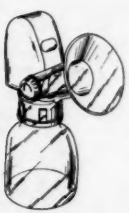
313,101
PATTERN FOR A CONVEYOR BELT
John A. Bartholomew, Boise, and Melvin A. Grindstaff, Meridian, both of Id., assignors to Fabrecka Products Company, Boston, Mass.
Filed Apr. 18, 1988, Ser. No. 182,577
Term of patent 14 years
U.S. Cl. D34—29



313,102
VEHICLE RAMP
David A. Cano, Salem, Ohio, assignor to Ganeaux Industries, Inc., Salem, Ohio
Filed Sep. 21, 1987, Ser. No. 98,668
Term of patent 14 years
U.S. Cl. D34—32

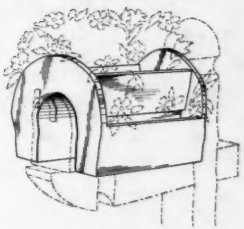


313,103
BREAST PUMP
Yusuke Kawano, Tokyo, Japan, assignor to Pigeon Co., Ltd., Tokyo, Japan
Filed Feb. 4, 1988, Ser. No. 152,418
Claims priority, application Japan, Aug. 5, 1987, 62-31614
Term of patent 14 years
U.S. Cl. D24—51



313,104
MAILBOX
George W. Bertram, R.R. #1, Box 207, Modoc, Ind. 47358
Filed Sep. 4, 1987, Ser. No. 92,995
Term of patent 14 years
U.S. Cl. D99—29

313,105
COMBINED MAILBOX COVER AND PLANTER BOX
Thomas H. Klahre, P.O. Box 31, Edison, N.J. 08818
Filed Jun. 28, 1988, Ser. No. 212,730
Term of patent 14 years
U.S. Cl. D99—29



313,106
ILLUMINATED MAIL BOX WITH NEWSPAPER HOLDER OR SIMILAR ARTICLE
Paul J. Hoffman, and Milton J. Fischer, both of P.O. Box 2501, Appleton, Wis. 54913
Division of Ser. No. 30,211, Mar. 25, 1987, Pat. No. Des. 306,228. This application Dec. 7, 1989, Ser. No. 447,119
Term of patent 14 years
U.S. Cl. D99—31

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF DECEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

: *See—*
Johnson, Nancy C.; Gill, Robert C.; Leahy, John F.; Gotzmer, Carl, Jr.; Fillman, Harold T.; and , 4,978,482, Cl. 264-3.100.

A. Menarini S.A.S.: *See—*
Casini, Alessandro; Parti, Sandro; and Bucci, Paolo, 4,978,772, Cl. 560-45.000.

A. O. Smith Corporation: *See—*
Ryno, Robert W., 4,978,293, Cl. 431-258.000.

A.T. & T. Paradyne: *See—*
Bottoms, Stanley; Betts, William L.; and Martinez, Kenneth, 4,979,184, Cl. 375-13.000.

A-teollisuus Oy: *See—*
Ahola, Aarno, 4,978,903, Cl. 318-778.000.

ABB Reaktor GmbH: *See—*
Stohr, Hans; and Mehr, Lothar, 4,977,782, Cl. 73-862.290.

Abbott Laboratories: *See—*
Bieniarz, Christopher; Cornwell, Michael J.; and Young, Douglas F., 4,978,613, Cl. 435-18.000.

Abe, Kunihiro; and Sakamoto, Masanori, to Fuji Jukogyo Kabushiki Kaisha. Air-fuel ratio control system for automotive engine. 4,977,881, Cl. 123-489.000.

Abe, Shinya: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Abe, Takao: *See—*
Tezuka, Toshiaki; and Abe, Takao, 4,978,580, Cl. 428-484.000.

Abe, Takayuki: *See—*
Matsumura, Hiroshi; Oota, Yasato; Matsumura, Tadashi; and Abe, Takayuki, 4,977,912, Cl. 134-104.400.

Abekas Video Systems Limited: *See—*
Snashall, Martin G.; Andrews, Mark R.; and Levy, David F., 4,979,022, Cl. 358-22.000.

Abex Corporation: *See—*
Edwards, Keith R., 4,977,986, Cl. 188-73.100.

Abisare Co., Ltd.: *See—*
Kasahara, Keiji, 4,978,118, Cl. 271-275.000.

Abramovich, Abe; and Robertson, Gordon I., to Cimflex Teknowledge Corporation. Compensating system for inspecting potentially warped printed circuit boards. 4,978,220, Cl. 356-394.000.

Ackerman, George, to AKH, Inc. Headless rivet. 4,978,270, Cl. 411-511.000.

Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, to Lion Corporation. Hair-growing agent. 4,978,681, Cl. 514-557.000.

Adachi, Masaharu; Uematsu, Yoshiaki; Nagano, Haruo; and Yamada, Koji, to Kabushiki Kaisha Sanyo Danki Seisakusho. Fare adjustment machine for prepaid card type tickets. 4,977,994, Cl. 194-210.000.

Adachi, Masahiro: *See—*
Yoshihiro, Yoshiro; Adachi, Masahiro; and Imai, Minoru, 4,978,498, Cl. 419-37.000.

Adams, Don L. Modular differential pressure transmitter/manifold for a fluid conveying pipeline. 4,977,917, Cl. 137-597.000.

Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, to NKK Corporation. Plated steel sheet for a can. 4,978,588, Cl. 204-192.310.

Ader, Milton: *See—*
Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., 4,977,839, Cl. 110-346.000.

Adiutori, Eugene F.; and Cahill, James E., to General Electric Company. Apparatus and method for determining heat transfer coefficient based on testing actual hardware rather than simplistic scale models of such hardware. 4,978,230, Cl. 374-43.000.

Adriaenssens, Peter I.: *See—*
Barchas, Jack D.; Elliott, Glen R.; Adriaenssens, Peter I.; Bitner, Robert S.; Bowersox, Stephen S.; and Nadasdi, Laszlo, 4,978,669, Cl. 514-292.000.

Advanced Micro Devices, Inc.: *See—*
Liu, Yow-Juang; and Hadjizadeh-Amini, Zahra, 4,978,627, Cl. 437-44.000.
McCool, John F., 4,979,167, Cl. 370-85.400.
Mehta, Mayur H., 4,979,193, Cl. 377-29.000.

Advani, Hira; and Terrell, William L., to International Business Machines Corporation. Modification of device configuration wherein the system specifies and prompts the user with only parameters required to be changed. 4,979,107, Cl. 364-200.000.

Aerospatiale Societe Nationale Industrielle: *See—*
Alquier, Bruno; Belou, Olivier; Devienne, Paul; and Martin, Thierry, 4,978,089, Cl. 244-129.500.

AG Communication Systems Corporation: *See—*
Crabbe, Edwin P., Jr., 4,979,108, Cl. 364-200.000.
Vonder, David L.; and Reimer, William A., 4,978,912, Cl. 324-158.00P.

Agence Spatiale Europeene: *See—*
Perryman, Michael A. C.; and Cox, Graham C., 4,979,221, Cl. 382-1.000.

Agency of Industrial Science & Technology: *See—*
Kajiwara, Shigeru; Maeda, Hidekatsu; and Suzuki, Hideo, 4,978,619, Cl. 435-182.000.

AGFA-Gevaert Aktiengesellschaft: *See—*
Roche, Edouard; Himmelmann, Wolfgang; Buschmann, Hans-Theo; and Quambusch, Heinz, 4,978,607, Cl. 430-642.000.

Agrawal, Govind P.; and Olsson, Nils A., to AT&T Bell Laboratories. Saturated semiconductor laser amplifier for compensation of optical fibre dispersion. 4,979,234, Cl. 455-608.000.

Agricola, Francis O.: *See—*
Barbera, Melvin A.; Agricola, Francis O.; Faller, Robert V.; and Bowman, Worth D., 4,978,522, Cl. 424-52.000.

Agristar, Inc.: *See—*
Kertz, Malcolm G., 4,978,505, Cl. 422-66.000.

Ahmed, Hassan J., to Westinghouse Electric Corp. Nuclear fuel pellet surface defect inspection apparatus. 4,978,495, Cl. 376-261.000.

Ahola, Aarno, to A-teollisuus Oy. Apparatus for the control of a three-phase a.c. motor, especially a squirrel-cage motor. 4,978,903, Cl. 318-778.000.

Ahrens, Kurt H.: *See—*
Grafe, Ingomar; Schickaneder, Helmut; and Ahrens, Kurt H., 4,978,773, Cl. 560-47.000.

AI Ware Incorporated: *See—*
Pao, Yoh-Han; and Khatibi, Farrokh, 4,979,126, Cl. 364-513.000.

Aihara, Yasuyuki; Baba, Shigeki; Shimizu, Chiharu; and Akiyama, Eitetsu, to Honda Giken Kogyo Kabushiki Kaisha. Cooling control system for internal combustion engines equipped with superchargers. 4,977,743, Cl. 60-605.300.

Aihara, Yasuyuki; Katoh, Shuji; Baba, Shigeki; and Akiyama, Eitetsu, to Honda Giken Kogyo Kabushiki Kaisha. Engine room-cooling control system. 4,977,862, Cl. 123-41.120.

Ainsworth, Oliver C.; and Glomski, Ronald L., to Dow Chemical Company, The. Thermoplastic elastomers based upon chlorinated polyethylene and a crystalline olefin polymer. 4,978,703, Cl. 524-298.000.

Ainsworth, Oliver C.: *See—*
Flynn, James H.; Ainsworth, Oliver C.; and Blanchard, Robert R., 4,978,716, Cl. 525-195.000.

Air Chex, Inc.: *See—*
Brown, Daniel M., 4,978,941, Cl. 340-447.000.

Air Comm Corporation: *See—*
Steiner, Norman F., 4,978,064, Cl. 237-12.30A.

Air Products and Chemicals, Inc.: *See—*
Nichols, James D.; and Dickenson, John B., 4,978,728, Cl. 525-528.000.

Aisens Co., Ltd.: *See—*
Yamakawa, Masami, 4,978,843, Cl. 250-216.000.

Aisin AW Kabushiki Kaisha: *See—*
Ito, Yasunobu; Yamada, Kunihiro; and Kubota, Akihiko, 4,979,072, Cl. 361-87.000.

Aizawa, Hideo, to Ricoh Company, Ltd. Image transferring device for image forming equipment. 4,978,998, Cl. 355-273.000.

Aizawa, Mamoru: *See—*
Sato, Masayuchi; Mori, Atsushi; and Aizawa, Mamoru, 4,978,389, Cl. 106-14.410.

Akado, Seishi, to Jeol Technics Co. Automatic focusing apparatus. 4,978,856, Cl. 250-310.000.

Akama, Naoya: *See—*
Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, 4,977,989, Cl. 192-56.00R.

Akamatsu, Hiroyuki, to Ricoh Company, Ltd. Eraser turn-on control for a copier. 4,978,996, Cl. 355-231.000.

Akao, Mutsuo, to Fuji Photo Film Co., Ltd. Laminated film. 4,978,572, Cl. 428-323.000.

Akaoka, Kenkichi: *See—*
Ikebe, Masaru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, 4,979,065, Cl. 360-133.000.

Akasaka, Kozo: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Akeyoshi, Kazuyuki; Matsumoto, Takeshi; Harada, Satoru; Nakamura, Masatake; and Ishikawa, Toshiyuki, to Asahi Glass Company, Ltd. Electromagnetic wave shielding transparent body. 4,978,812, Cl. 174-35.0MS.

AKH, Inc.: *See—*
Ackerman, George, 4,978,270, Cl. 411-511.000.

Aki, Shinichi; Kobayashi, Masaaki; Muraji, Tsutomu; and Takeuchi, Akihiro, to Matsushita Electric Industrial Co., Ltd. Magnetic recording and reproducing apparatus for recording upper-sideband-eliminated FM signal. 4,979,046, Cl. 358-330.000.

Akimoto, Mitsuru; Jimbo, Takamasa; Umemura, Kiyoshi; Iwase, Haruhiko; and Ogawa, Kenzirou, to Furukawa Denki Kogyo Kabushiki Kaisha; and Yamaichi Denki Kogyo Kabushiki Kaisha. Laminated board for testing electronic components. 4,978,914, Cl. 324-158.00F.

Akiyama, Eitetsu: *See—*
Aihara, Yasuyuki; Baba, Shigeki; Shimizu, Chiharu; and Akiyama, Eitetsu, 4,977,743, Cl. 60-605.300.
Aihara, Yasuyuki; Katoh, Shuji; Baba, Shigeki; and Akiyama, Eitetsu, 4,977,862, Cl. 123-41.120.

Akizuki, Toshio: *See—*
Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.

Albers, Lloyd R., to Phillips Petroleum Company. Control of a blending system. 4,979,091, Cl. 364-148.000.

Albers, Stephen J.: *See—*
Grimshaw, Michael N.; Albers, Stephen J.; and Rust, Ralph J., 4,978,417, Cl. 156-574.000.

Albizzati, Enrico: *See—*
Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, 4,978,648, Cl. 502-127.000.

Albrecht, Paul; and Cohen, Richard J., to Massachusetts Institute of Technology. Characterizing the statistical properties of a biological signal. 4,979,110, Cl. 364-413.030.

Alcan International Limited: *See—*
Woolam, Carl A., 4,978,259, Cl. 409-132.000.

Alcatel N.V.: *See—*
Brehm, Claude; Ramos, Josiane; and Dupont, Philippe, 4,978,377, Cl. 65-3.110.
Veith, Gustav, 4,978,190, Cl. 350-96.180.

Aldrich Chemical Company, Inc.: *See—*
Brown, Herbert C., 4,978,794, Cl. 568-1.000.

Aldrich, Peter D.: *See—*
Lyons, John W.; Roper, John A., III; and Aldrich, Peter D., 4,978,863, Cl. 250-574.000.

Alessi, Paula J.; Giorgianni, Edward J.; and Madden, Thomas E., to Eastman Kodak Company. Color imaging apparatus producing on various image receptive materials a visually matched hard copy reproduction of a video image displayed. 4,979,032, Cl. 358-76.000.

Alexander, Dean D. Training aid for shoelace tying. 4,978,304, Cl. 434-260.000.

Alexander, James C., to Serco Corporation. Control circuit for vertically storing dock leveler. 4,977,635, Cl. 14-71.300.

Alexander, Randall W.; and Troupes, Demetrios, to International Business Machines Corporation. Temperature limiting apparatus and method for printer. 4,978,239, Cl. 400-124.000.

Alfa-Laval AB: *See—*
Luchetta, Joseph F.; and Eberle, Louis C., 4,978,331, Cl. 494-37.000.

Alfa-Laval Separation AB: *See—*
Klintenstedt, Kjell, 4,978,370, Cl. 55-36.000.

Alfred Teves GmbH: *See—*
Schmidt, Herbert; Czich, Erhard; and Hefner, Horst, 4,977,987, Cl. 188-264.00G.

Alizol S.A.: *See—*
Fougeres, Michel, 4,978,025, Cl. 222-105.000.

Allen-Bradley Company, Inc.: *See—*
Merrison, John C.; DeLange, Robert J.; and Rowan, Timothy M., 4,978,897, Cl. 318-268.000.

Allen, Charles H., III, to Allen Gauge & Tool Company. Hand held ovality gauge. 4,977,682, Cl. 33-550.000.

Allen, Dennis; Del Fava, Donald; Geesey, Harold D.; Koht, Lowell I.; McClintic, Mark S.; Newton, Dean A.; and Petro, Timothy L., Sr., to Raynet Corporation. Stepped cable block. 4,978,194, Cl. 350-96.230.

Allen, Diane E.; and DeMartino, Ronald N., to Hoechst Celanese Corp. Side chain polymers exhibiting nonlinear optical response. 4,978,476, Cl. 252-299.010.

Allen Gauge & Tool Company: *See—*
Allen, Charles H., III, 4,977,682, Cl. 33-550.000.

Allen, John W., to Redcliffe Electronics Limited. Electrical switches. 4,978,824, Cl. 200-447.000.

Allen, Richard G.; and Freerksen, Donald L., to International Business Machines Corporation. Two-bit floating point divide circuit with single carry-save adder. 4,979,142, Cl. 364-767.000.

Allergan, Inc.: *See—*
Van Gent, Stanley L., 4,978,354, Cl. 623-6.000.

Allevard Industries S.A.: *See—*
Deuchemin, Michel, 4,978,065, Cl. 238-366.000.

Allgood, Fred A.: *See—*
Terrill, Richard C.; Allgood, Fred A.; and Cunningham, John A., 4,978,340, Cl. 604-195.000.

Allied-Signal: *See—*
Das, Sajal; and Prevorsek, Dusan C., 4,978,727, Cl. 525-504.000.

Allied-Signal Inc.: *See—*
Shankland, Ian R.; and Lund, Earl A. E., 4,978,467, Cl. 252-69.000.
Sun, Jim C.; Boone, Mark B.; Dunbar, James J.; and Weedon, Gene C., 4,978,492, Cl. 264-180.000.

Almond, Gary R.; and Nobile, Daniel A., to Data General Corporation. Method and apparatus for performing format conversion between bit streams. 4,979,169, Cl. 370-99.000.

Alps Electric Co., Ltd.: *See—*
Kawata, Toshihiko; Mizuta, Ken; and Fukuda, Kazuaki, 4,979,066, Cl. 361-10.000.
Sato, Hiroyuki; and Shinoyama, Yujiro, 4,978,823, Cl. 200-437.000.

Alquier, Bruno; Belou, Olivier; Devienne, Paul; and Martin, Thierry, to Aerospatiale Societe Nationale Industrielle. Pyrotechnic system for providing an emergency exit in an aircraft. 4,978,089, Cl. 244-129.500.

Alston, Howard W.; Peacock, Ronald E.; and Schondell, Douglas G., to Augers Unlimited, Inc. Steering and lubricating apparatus for portable earth boring machine with steering head. 4,977,967, Cl. 175-45.000.

Alter, Martin J., to Micrel Incorporated. Hidden zener diode structure in configurable integrated circuit. 4,979,001, Cl. 357-13.000.

Alteron Incorporated: *See—*
Terrill, Richard C.; Allgood, Fred A.; and Cunningham, John A., 4,978,340, Cl. 604-195.000.

Althaus, Hans: *See—*
Volker, Theodor; and Althaus, Hans, 4,978,791, Cl. 564-335.000.

Altherr, Russell G., to Amsted Industries Incorporated. Body bolster center plate assembly. 4,977,835, Cl. 105-199.400.

Altizer, Eugene E., to Mweld, Inc. Roofing membrane. 4,977,673, Cl. 30-294.000.

Alusuisse-Lonza Services Ltd.: *See—*
Aubrey, Leonard S., 4,978,452, Cl. 210-510.100.

Alza Corporation: *See—*
Theeuwes, Felix, 4,978,337, Cl. 604-85.000.

AM International Incorporated: *See—*
Chandhoke, Mohanijit S.; and Bryson, Robert A., Sr., 4,977,827, Cl. 100-7.000.

Amada Company, Limited: *See—*
Naito, Kinshiro, 4,977,804, Cl. 83-76.700.
Umetsu, Masahito; and Matsuda, Morikatsu, 4,978,828, Cl. 219-69.120.

Amada Wasino Company, Limited: *See—*
Umetsu, Masahito; and Matsuda, Morikatsu, 4,978,828, Cl. 219-69.120.

Amador, Gonzalo, to Texas Instruments Incorporated. Damped optics tube assembly. 4,978,050, Cl. 228-4.500.

Amarel Precision Instruments, Inc.: *See—*
Hazard, Edwin A., 4,978,212, Cl. 351-212.000.

Amdahl Corporation: *See—*
Schneider, Frederick W., 4,979,106, Cl. 364-200.000.

American Cyanamid Company: *See—*
Card, Roger J., 4,978,803, Cl. 568-486.000.
Ellestad, George A.; and McGahren, William J., 4,978,748, Cl. 536-17.500.
Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

American Optical Corporation: *See—*
Metcalfe, Richard T.; and Salce, Arthur J., 4,977,627, Cl. 2-437.000.

American Safety Razor Company: *See—*
Iten, Clemens A., 4,977,670, Cl. 30-49.000.

American Standard Inc.: *See—*
Balukin, Richard F., 4,978,179, Cl. 303-33.000.
Steffes, Rudolf, 4,977,641, Cl. 16-121.000.

American Sterilizer Company: *See—*
George, John W.; and Taylor, Laurence D., 4,978,028, Cl. 220-403.000.

American Waste Reduction Corporation: *See—*
Summers, William A., 4,977,840, Cl. 110-346.000.

Ammon, Robert L.: *See—*
Drake, Curtis L.; Przywarty, Francis L.; and Ammon, Robert L., 4,978,557, Cl. 427-37.000.

Amoco Corporation: *See—*
Amone, Michael J.; and Dean, Barry D., 4,978,739, Cl. 528-271.000.
Daugherty, Paul R.; McNair, Jerry R.; and O'Donnell, Patrick F., 4,978,485, Cl. 264-40.200.

Amone, Michael J.; and Dean, Barry D., to Amoco Corporation. Process for preparing polyarylate from an ester derivative of a dihydric phenol. 4,978,739, Cl. 528-271.000.

AMP Incorporated: *See—*
Billman, Timothy B.; and Taylor, Attalee S., 4,978,307, Cl. 439-83.000.
Billman, Timothy B.; and Thrush, Roger L., 4,978,822, Cl. 200-302.100.
Kaufman, John W., 4,978,308, Cl. 439-83.000.
Oda, Kenzo; and Hirano, Seiji, 4,978,311, Cl. 439-188.000.

Amsted Industries Incorporated: *See—*
Altherr, Russell G., 4,977,835, Cl. 105-199.400.

Amstislavskaya, Tatyana S.: *See—*
Fedorov, Svyatoslav N.; Bagrov, Sergei N.; Trofimov, Vladislav T.; Amstislavskaya, Tatyana S.; and Osipov, Alexei V., 4,978,352, Cl. 606-166.000.

Amstore Corporation: *See—*
Amstutz, Douglas D.; and Vanderboegh, Ronald A., 4,979,078, Cl. 362-125.000.

Amstutz, Douglas D.; and Vanderboegh, Ronald A., to Amstore Corporation. Lighted display case. 4,979,078, Cl. 362-125.000.

Analog Devices, Inc.: *See*—
Jordan, E. Perry, 4,978,871, Cl. 307-475.000.
Anandan, Munisamy; and Ketchum, Douglas, to Thomas Electronics Incorporated. Thick-film integrated flat fluorescent lamp. 4,978,888, Cl. 315-58.000.
Anapliotis, Emmanuel: *See*—
Goymann, Volkmar; Anapliotis, Emmanuel; and Kranz, Curt, 4,978,357, Cl. 623-18.000.
Anchor Hocking Corporation: *See*—
Hayes, Thomas H., 4,978,016, Cl. 215-252.000.
Ancona, Mario, to United States of America, Navy. High frequency, frequency multiplier using parallel Gunn diodes. 4,978,928, Cl. 331-107.00G.
Anderson, Carl R.; and Seaman, Gary G., to AT&T Bell Laboratories. Multiple wire straightener module for an automated cable assembly system. 4,977,934, Cl. 140-147.000.
Anderson, Eugene A.: *See*—
Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., 4,978,077, Cl. 241-30.000.
Anderson, Franklin R.; and Schroer, John M., to Custom Molders Inc. Bundling strap. 4,978,091, Cl. 248-74.300.
Anderson, Harry J. Light-reflective marker. 4,977,851, Cl. 116-209.000.
Andersson, Alf: *See*—
Andersson, Ralf; and Andersson, Alf, 4,978,069, Cl. 239-224.000.
Andersson, Ralf; and Andersson, Alf. Method and apparatus for the formation of droplets. 4,978,069, Cl. 239-224.000.
Ando, Norio: *See*—
Kosugi, Seiji; Ando, Norio; and Sagara, Hisao, 4,978,148, Cl. 285-133.100.
Ando, Takashi: *See*—
Kishimoto, Yoshinobu; Ando, Takashi; and Kudo, Harumi, 4,979,061, Cl. 360-96.500.
Andreas Stihl: *See*—
Kloft, Manfred, 4,977,708, Cl. 51-170.00R.
Andres, Rudolf; Knoll, Heinz; Pfistner, Harald; and Petri, Voker, to Mercedes-Benz AG. Energy absorbing device for safety belts of motor vehicles. 4,978,139, Cl. 280-805.000.
Andrew Corportion: *See*—
Saad, Saad M., 4,978,934, Cl. 333-241.000.
Andrews, John M., Jr.; Lifshitz, Nadia; and Smolinsky, Gerald, to AT&T Bell Laboratories. Method of manufacturing semiconductor devices involving the detection of impurities. 4,978,915, Cl. 324-158.00R.
Andrews, Mark R.: *See*—
Snashall, Martin G.; Andrews, Mark R.; and Levy, David F., 4,979,022, Cl. 358-22.000.
Andrews, Robert S. L.; and Reier, Gerald J., to GMD Engineered Systems, Inc. Method for separating hazardous substances in waste foundry sands. 4,978,076, Cl. 241-5.000.
Andros, Andrew A.; and Campana, Thomas J., to Telefind Corporation. Paging receiver with dynamically programmable channel frequencies. 4,978,944, Cl. 340-825.440.
Anegawa, Takao, to Kabushiki Kaisha Toshiba. IC card having energy input and data exchange elements on opposite sides thereof. 4,978,840, Cl. 235-492.000.
Anno, Masahiro; Machida, Junji; Ohtani, Junji; Sano, Eiichi; and Masuda, Fumio, to Minolta Camera Kabushiki Kaisha. Photoconductive toner containing polymeric-magnetic coordination complex. 4,978,595, Cl. 430-106.600.
Antons, Peter; and Antons, Samra L. Disposable tooth color shade guide. 4,978,296, Cl. 433-26.000.
Antons, Samra L.: *See*—
Antons, Peter; and Antons, Samra L., 4,978,296, Cl. 433-26.000.
Aoki, Akio; and Ishii, Yoshiki, to Canon Kabushiki Kaisha. Predictive coding device. 4,979,187, Cl. 375-27.000.
Aoki, Hideharu: *See*—
Wakita, Naomasa; Aoki, Hideharu; and Okuda, Makoto, 4,978,881, Cl. 310-328.000.
Aoki, Hisao; and Yamaguchi, Toru, to Sanden Corporation. Heat exchanger. 4,977,956, Cl. 165-176.000.
Aoki, Kunimitsu: *See*—
Suzuki, Yoshiyuki; and Aoki, Kunimitsu, 4,978,196, Cl. 350-174.000.
Aoki, Makoto; Tahara, Yoshifumi; and Arai, Izumi, to Tokyo Electron Limited. Plasma processing device. 4,978,412, Cl. 156-345.000.
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, to Honda Giken Kogyo Kabushiki Kaisha. Method of shift control in an automatic transmission. 4,977,797, Cl. 74-866.000.
Aoki, Yuji: *See*—
Umemoto, Akio; Aoki, Yuji; Numata, Katuyosi; and Suzuki, Hideo, 4,979,200, Cl. 378-185.000.
Aono, Yukihiko. Foldable box. 4,978,020, Cl. 220-7.000.
Aoshiba, Mitsunori: *See*—
Nakanose, Megumi; Koyama, Naoyuki; Aoshiba, Mitsunori; and Motegi, Tadao, 4,979,181, Cl. 372-98.000.
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, to Kao Corporation. Quaternary ammonium salts of dicyano substituted teriary alkylene diamines as bleach activators. 4,978,770, Cl. 558-455.000.
Aoyama, Norihito; Miike, Akira; Shimizu, Yoshiaki; and Tatano, Toshio, to Kyowa Medex Co., Ltd. Method for the determination of the compound having mercapto group. 4,978,615, Cl. 435-25.000.
Apollo Computer Inc.: *See*—
Milia, Andrew; and Bahr, Richard G., 4,979,099, Cl. 364-200.000.
Appel, James J., to Xerox Corporation. Raster scanning system utilizing overfilled polygon facet design with non-reflective facet edges. 4,978,185, Cl. 350-6.800.
Applied ImmuneSciences, Inc.: *See*—
Clark, Brian R., 4,978,724, Cl. 525-350.000.
Apps, William P.; Rehrig, James B.; and Hagan, John A., to Rehrig-Pacific Company, Inc. Cross-stacking bottle case. 4,978,002, Cl. 206-201.000.
APV Crepaco, Inc.: *See*—
Milleson, Joseph P., 4,977,727, Cl. 53-543.000.
Arai, Izumi: *See*—
Aoki, Makoto; Tahara, Yoshifumi; and Arai, Izumi, 4,978,412, Cl. 156-345.000.
Araki, Hiroyuki: *See*—
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.
Araki, Yoshitugu, to Pioneer Electronic Corporation. Front loading disk player. 4,979,160, Cl. 369-75.200.
Archive Corporation: *See*—
Howell, Jones V., 4,978,955, Cl. 341-109.000.
Arco Chemical Technology, Inc.: *See*—
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., 4,978,779, Cl. 560-344.000.
Ardeshir, Feroza; Flint, Janette E.; and Reese, Robert T., to Scripps Clinic and Research Foundation. Merozoite surface antigens. 4,978,621, Cl. 435-243.000.
Ardissone, Alberto, to Polistock N.V. Method for producing laminated panels having folds. 4,978,407, Cl. 156-216.000.
Ardon, Menachem T., to AT&T Bell Laboratories. Switching system reliability. 4,979,164, Cl. 370-58.100.
Ares-Serono Research & Development Limited Partnership: *See*—
Shanks, Ian A.; and Smith, Alan M., 4,978,503, Cl. 422-58.000.
Arima, Jiro; and Tsujimura, Hiroji, to Minolta Camera Kabushiki Kaisha. Pyrometer. 4,979,133, Cl. 364-557.000.
Arima, Jiro; Tsujimura, Hiroji; Narita, Tomonori; and Takebuchi, Hiroki, to Minolta Camera Kabushiki Kaisha; and Tokyo Electron Limited. Method for measuring surface temperature of semiconductor wafer substrate, and heat-treating apparatus. 4,979,134, Cl. 364-557.000.
Arimoto, Kazutami: *See*—
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, 4,979,013, Cl. 357-55.000.
Arizona Board of Regents: *See*—
Pettit, George R.; and Singh, Sheo B., 4,978,744, Cl. 530-330.000.
Armbruster, Joseph M. Illuminated medallion. 4,977,695, Cl. 40-541.000.
Armstrong World Industries, Inc.: *See*—
Barrall, Jeffery L., 4,978,642, Cl. 501-84.000.
Arnold, George W., Jr.; Ashby, Carol I. H.; and Brannon, Paul J., to United States of America, Energy. Controlled ion implant damage profile for etching. 4,978,418, Cl. 156-628.000.
Arnosti, Hansjorg; and Bussmann, Hans, to Inventio. Apparatus and method for detecting elevator car position in a door zone. 4,977,984, Cl. 187-134.000.
Aro Corporation, The: *See*—
Vonalt, Kerry G., 4,978,283, Cl. 417-511.000.
Arrathoon, Raymond. High fan factor modified crossbar architecture and method for optical digital computing. 4,979,138, Cl. 364-713.000.
Arthur, William D., III, to Medex, Inc. Infusion pump with bar code input to computer. 4,978,335, Cl. 604-67.000.
Aruga, Tatsuo: *See*—
Hashimoto, Hiroshi; Aruga, Tatsuo; Fujisawa, Eiichi; and Obana, Yoshinari, 4,977,870, Cl. 123-195.00C.
Asada Mill Co., Ltd.: *See*—
Yamada, Osamu; and Shinohara, Kozo, 4,978,516, Cl. 423-331.000.
Asahi Chemical Polyflex Ltd.: *See*—
Kai, Hisao; and Nakashima, Kiyoshi, 4,977,807, Cl. 83-676.000.
Asahi Diamond Industrial Co., Ltd.: *See*—
Une, Kouji, 4,977,710, Cl. 51-309.000.
Asahi Glass Company, Ltd.: *See*—
Akeyoshi, Kazuyuki; Matsumoto, Takeshi; Harada, Satoru; Nakamura, Masatake; and Ishikawa, Toshiyuki, 4,978,812, Cl. 174-35.0MS.
Asahi Kogaku Kogyo Kabushik Kaisha: *See*—
Ito, Takayuki, 4,978,204, Cl. 350-423.000.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Satoh, Osamu; Hirai, Isamu; and Nakata, Masahiro, 4,978,981, Cl. 354-410.000.
Asakawa, Stuart D., to Hewlett-Packard Company. Wheel supported carriage for a scanning plotter. 4,978,979, Cl. 346-140.00R.
Asakura, Koji: *See*—
Takagawa, Ryozo; Tanabe, Hisaki; Asakura, Koji; Yamada, Mitsuo; Ohsugi, Hiroharu; Mizuguchi, Ryuzo; and Eguchi, Yoshio, 4,978,777, Cl. 560-224.000.
Asakura, Yoshio: *See*—
Nakagawa, Kanji; Asakura, Yoshio; Yamamoto, Shigeru; Ninomiya, Kohei; and Kinouchi, Masayuki, 4,978,430, Cl. 203-014.000.
Asano, Kyoichi: *See*—
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

Asano, Masamichi: *See*—
Yokoyama, Sadayuki; Asano, Masamichi; Iwahashi, Hiroshi; and Nakagawa, Kaoru, 4,979,146, Cl. 365-185.000.

Asano, Takehiko: *See*—
Mizutani, Yosuke; Asano, Takehiko; Yanase, Syuji; Kitagawa, Shinichiro; and Yamashita, Akihiko, 4,979,037, Cl. 358-133.000.

Asari, Akira; Kanda, Kuniaki; Okamoto, Hiroshi; and Ueda, Masakazu, to Kabushiki Kaisha Kobe Seiko Sho. Press device. 4,977,774, Cl. 72-456.000.

Ashby, Carol I. H.: *See*—
Arnold, George W., Jr.; Ashby, Carol I. H.; and Brannon, Paul J., 4,978,418, Cl. 156-628.000.

Ashihara, Hiyuki. Racket with rotary crosshandle. 4,978,123, Cl. 273-73.00R.

Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Dog clutch mechanism. 4,977,989, Cl. 192-56.00R.

Ashley, James P., to Rockwell International Corporation. Announcement and tone code generator for telephonic network and method. 4,979,171, Cl. 370-110.200.

Astley, Graham J.: *See*—
Belanger, James A.; Wentworth, Robert J.; and Astley, Graham J., 4,977,689, Cl. 34-243.00C.

AT&E Corporation: *See*—
Suter, Richard R., 4,978,930, Cl. 331-176.000.

AT&T Bell Laboratories: *See*—
Agrawal, Govind P.; and Olsson, Nils A., 4,979,234, Cl. 455-608.000.
Anderson, Carl R.; and Seaman, Gary G., 4,977,934, Cl. 140-147.000.
Andrews, John M., Jr.; Lifshitz, Nadia; and Smolinsky, Gerald, 4,978,915, Cl. 324-158.00R.
Ardon, Menachem T., 4,979,164, Cl. 370-58.100.
Bair, Harvey E.; and Matsuoka, Shiro, 4,978,712, Cl. 525-51.000.
Benvenuto, Nevio; and Goeddel, Thomas W., 4,979,211, Cl. 381-43.000.
Blonder, Greg E.; Henry, Charles H.; Kazarinov, Rudolf F.; and Wolfe, Raymond, 4,978,189, Cl. 350-96.120.
Chamzas, Christodoulos; and Duttweiler, Donald L., 4,979,049, Cl. 358-426.000.
Cheng, Ying; and Dravida, Subrahmanyam, 4,979,174, Cl. 371-41.000.
Dighe, Rajiv S.; and May, Carl J., Jr., 4,979,165, Cl. 370-60.000.
Durnwirth, Roy K., Jr.; George, John E.; and Morton, Kim L., 4,978,423, Cl. 156-659.100.
Erving, Richard H.; Ford, William A.; and Miller, Robert R., II, 4,979,163, Cl. 370-32.100.
Hinton, Harvard S.; Lentine, Anthony L.; and Miller, David A. B., 4,978,842, Cl. 250-213.00A.
Knox, Wayne H.; and Miller, David A. B., 4,978,910, Cl. 324-96.000.
Padden, Frederick W.; and Ulrich, Werner, 4,979,206, Cl. 379-67.000.
Rzeszewski, Theodore S., 4,979,228, Cl. 382-54.000.
Smith, Douglas C., 4,978,907, Cl. 324-72.500.

Atkinson, Jeffrey G.: *See*—
Leake, Craig; Foran, Michael; and Atkinson, Jeffrey G., 4,978,411, Cl. 156-336.000.

Atochem: *See*—
Masini, Jean-Jacques; and Collier, Bertrand, 4,978,435, Cl. 204-157.940.

Atochem North America, Inc.: *See*—
Kazmierczak, Robert T.; and MacLeay, Ronald E., 4,978,699, Cl. 529-99.000.

Aton, Thomas J.: *See*—
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebeca J., 4,978,908, Cl. 324-158.00R.

Atsumi, Koji: *See*—
Misumi, Masao; and Atsumi, Koji, 4,977,781, Cl. 73-861.220.

Aubrey, Leonard S., to Alusuisse-Lonza Services Ltd. Method for producing wax impregnated filters for investment casting applications. 4,978,452, Cl. 210-510.100.

Audio Teknology Incorporated: *See*—
Strahm, Chris N., 4,979,218, Cl. 381-94.000.

Audiovox International Limited: *See*—
Chen, Ding B., 4,979,220, Cl. 381-192.000.

Auer, Kurt: *See*—
Hulek, Anton; Koller, Werner; and Auer, Kurt, 4,978,107, Cl. 266-201.000.

Augers Unlimited, Inc.: *See*—
Alston, Howard W.; Peacock, Ronald E.; and Schondell, Douglas G., 4,977,967, Cl. 175-45.000.

Austin, Michael J.: *See*—
Cueman, Michael K.; Thomas, Lewis J., III; Trzaskos, Casmir R.; Matula, August D.; and Austin, Michael J., 4,979,199, Cl. 378-121.000.

Automated Engineering Systems Limited: *See*—
Hartopp, Robert, 4,977,872, Cl. 123-198.00A.

Autoplan Heimerdinger & Stabler GmbH & Co.: *See*—
Nissler, Siegfried, 4,978,987, Cl. 354-322.000.

Avantek, Inc.: *See*—
Hua, Chang-Hwang; Chan, Simon S.; Day, Ding-Yuan S.; and Lee, Adrian C., 4,978,639, Cl. 437-230.000.

Avasthi, Jitendra M., to Chevron Research Company. Method to create parallel vertical fractures in inclined wellbores. 4,977,961, Cl. 166-297.000.

Aviation Limited: *See*—
Sellwood, Raymund E.; and Hartfield, Peter T., 4,979,087, Cl. 363-34.000.

Awano, Hiroshi; Kawabata, Yuka; and Iwai, Takayoshi, to Kabushiki Kaisha Toshiba. Sensor and method for the production thereof. 4,977,658, Cl. 29-25.010.

B. F. Goodrich Company, The: *See*—
Ewall, Ralph X., 4,977,892, Cl. 128-156.000.

B & H Manufacturing Company, Inc.: *See*—
Potter, Terry; Breno, Philip J.; and Bright, Lyn E., 4,978,416, Cl. 156-571.000.

Baba, Shigeki: *See*—
Aihara, Yasuyuki; Baba, Shigeki; Shimizu, Chiharu; and Akiyama, Eitetsu, 4,977,743, Cl. 60-605.300.
Aihara, Yasuyuki; Katoh, Shuji; Baba, Shigeki; and Akiyama, Eitetsu, 4,977,862, Cl. 123-41.120.

Babbs, Charles F.; and Badylak, Stephen F., to Purdue Research Foundation. Treatment to reduce ischemic tissue injury. 4,978,668, Cl. 514-258.000.

Babler, Fridolin, to Ciba-Geigy Corporation. Perylenetetracarboxylic acid diimides having long-chain radicals containing carbonyl groups. 4,978,755, Cl. 546-37.000.

Babson, Roger M. Hand-held skate sail. 4,978,140, Cl. 280-810.000.

Babuk, Vitaly V.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Bach, Valerie A., to Hewlett-Packard Company. Single chamber via etch through a dual-layer dielectric. 4,978,420, Cl. 156-643.000.

Bachmann, Thomas: *See*—
Maier, Willy; Bachmann, Thomas; Konrad, Martin; and Staub, Markus, 4,978,117, Cl. 271-206.000.

Badylak, Stephen F.: *See*—
Babbs, Charles F.; and Badylak, Stephen F., 4,978,668, Cl. 514-258.000.

Bagnell, Glade N.: *See*—
Stefansky, Frederick M.; and Bagnell, Glade N., 4,979,062, Cl. 360-97.020.

Bagrov, Sergei N.: *See*—
Fedorov, Svyatoslav N.; Bagrov, Sergei N.; Trofimov, Vladislav T.; Amstislavskaya, Tatyana S.; and Osipov, Alexei V., 4,978,352, Cl. 606-166.000.

Bahr, Richard G.: *See*—
Milia, Andrew; and Bahr, Richard G., 4,979,099, Cl. 364-200.000.

Baiker, Alfons; and Gasser, Daniel, to Lonza Ltd. Catalyst for the oxidation of carbon compounds. 4,978,513, Cl. 423-245.300.

Bair, Harvey E.; and Matsuoka, Shiro, to AT&T Bell Laboratories. Method for fabricating devices including polymeric materials. 4,978,712, Cl. 525-51.000.

Baker, David A.: *See*—
Morley, Richard E.; and Baker, David A., 4,979,074, Cl. 361-386.000.

Baker, Frank K.: *See*—
Poon, Stephen S.; Pfiester, James R.; Baker, Frank K.; and Klein, Jeffrey L., 4,978,626, Cl. 437-44.000.

Baker Hughes Incorporated: *See*—
Ketcham, Carl C., 4,979,112, Cl. 364-422.000.

Balint, Laszlo : *See*—
Erdosi, Gyorgy; Balint, Laszlo ; and Osvath, Peter, 4,977,686, Cl. 34-9.500.

Ball, Garry L.: *See*—
Radke, Daniel D.; Pabodie, Robert M., Jr.; and Ball, Garry L., 4,978,273, Cl. 414-697.000.

Ball, Martin F.; and Vokins, Ian M. Packaging. 4,978,056, Cl. 229-123.200.

Ballou, Byron T., to University of Pittsburgh. Novel method for selection of primate tumor-associated antigens suitable as in vivo targets for antibodies. 4,978,520, Cl. 424-1.100.

Balser, Klaus: *See*—
Wilke, Michaela; Szablikowski, Klaus; and Balser, Klaus, 4,978,750, Cl. 536-114.000.

Balukin, Richard F., to American Standard Inc. Brake assurance circuit operative in response to a low brake pipe pressure. 4,978,179, Cl. 303-33.000.

Bando Chemical Industries, Ltd.: *See*—
Fujiwara, Akinori; Matsuoka, Hiroshi; Onoe, Susumu; and Kusaka, Kenji, 4,978,409, Cl. 156-315.000.

Bando, Niro: *See*—
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatomi, 4,977,733, Cl. 56-14.700.

Banks, Christopher P.; and Irving, Edward, to Ciba-Geigy Corporation. Process for forming images. 4,978,604, Cl. 430-327.000.

Banuelos, Angel F.: *See*—
Yin, Khin S.; Virgadamo, Michael J.; Tanaka, David D.; and Banuelos, Angel F., 4,978,593, Cl. 430-2.000.

Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, to Himont Incorporated. Catalysts for the polymerization of olefins. 4,978,648, Cl. 502-127.000.

Barbera, Melvin A.; Agricola, Francis O.; Faller, Robert V.; and Bowman, Worth D., to Procter & Gamble Company, The. Oral compositions. 4,978,522, Cl. 424-52.000.

Barchas, Jack D.; Elliott, Glen R.; Adriaenssens, Peter I.; Bitner, Robert S.; Bowersox, Stephen S.; and Nadasdi, Laszlo, to Neurex Corporation. Method of suppressing appetite by administration of tetrahydro-beta-carboline derivatives. 4,978,669, Cl. 514-292.000.

Bardhan, Pronob; Bartholomew, Roger F.; Trotter, Donald M., Jr.; and Yu, Chyang J., to Corning Incorporated. Capacitors and high dielectric constant ceramics therefor. 4,978,646, Cl. 501-134.000.

Barino, Luisa: *See*—
Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, 4,978,648, Cl. 502-127.000.

Barnes, Thomas J.: *See*—
Pratt, Hugh M. O., 4,977,783, Cl. 73-862.390.

Barr, Frederick J., to Halliburton Geophysical Services, Inc. System for attenuation of water-column reverberations. 4,979,150, Cl. 367-24.000.

Barr, Richard. Life step stabilizer. 4,977,844, Cl. 114-123.000.

Barradas, Scott: *See*—
Farber, Bruce; Kunsemiller, John; and Barradas, Scott, 4,977,966, Cl. 173-159.000.

Barrall, Jeffery L., to Armstrong World Industries, Inc. Rigid, water-resistant phosphate ceramic materials having acoustic channeling and processes for preparing them. 4,978,642, Cl. 501-84.000.

Barrett, John P. Water closet arm assembly. 4,977,628, Cl. 4-237.000.

Barrett, William A.; and Puri, Amitabh, to Lasa Industries, Inc. Automatic leveling system and a method of leveling a workpiece based on focus detection. 4,978,841, Cl. 250-548.000.

Bartholomew, Roger F.: *See*—
Bardhan, Pronob; Bartholomew, Roger F.; Trotter, Donald M., Jr.; and Yu, Chyang J., 4,978,646, Cl. 501-134.000.

Bartlett, Dana W. Lift and rudder fin attachment. 4,977,847, Cl. 114-274.000.

Basadonna, Luciano: *See*—
Maiocco, Roberto; and Basadonna, Luciano, 4,979,224, Cl. 382-8.000.

BASF Aktiengesellschaft: *See*—
Baur, Richard; Birnbach, Stefan; Oftring, Alfred; and Winkler, Ekhard, 4,978,805, Cl. 568-622.000.
Fikentscher, Rolf; Greif, Norbert; Oppenlaender, Knut; and Stork, Karl, 4,978,780, Cl. 562-42.000.
Ostertag, Werner; and Mronga, Norbert, 4,978,394, Cl. 106-404.000.
Pfohl, Sigberg; Kroener, Michael; Hartmann, Heinrich; and Denzinger, Walter, 4,978,427, Cl. 162-168.200.
Schmidt-Hellerau, Christof; Weber, Engelbert; and Matthias, Guenther, 4,978,711, Cl. 524-841.000.

BASF Corporation: *See*—
Fowler, Chris W.; Knight, Michael C.; and Nicholas, Anthony J., 4,978,708, Cl. 524-507.000.
Kim, Bongsub; and Kaack, Hermann, 4,978,797, Cl. 568-315.000.

Basile, Carlo: *See*—
Tsinberg, Mikhail; Cavallerano, Alan P.; and Basile, Carlo, 4,979,023, Cl. 358-31.000.

Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., to International Business Machines Corporation. Monolithic silicon membrane device fabrication process. 4,978,421, Cl. 156-645.000.

Batrice, Mazen P. Automotive oil change apparatus. 4,977,978, Cl. 184-1.500.

Battelle Memorial Institute: *See*—
Boswell, Peter; Negaty-Hindi, Guy; and Berce, Tatiana, 4,977,947, Cl. 164-71.100.

Battu, Ramgopal: *See*—
Ghose, Sanjoy; Battu, Ramgopal; and Jabbari, Iraj, 4,979,063, Cl. 360-106.000.

Bauduin, Serge: *See*—
Sabater, Jacques; Kerneis, Jean C.; and Bauduin, Serge, 4,978,861, Cl. 250-571.000.

Bauer, Johann: *See*—
Wilhelm, Klaus; Bauer, Johann; Schmitt, Werner; Herold, Wolf-Dietrich; Koran, Peter; Wanek, Erich; and Gasser, Oswald, 4,978,359, Cl. 623-23.000.

Bauer, Michael J.: *See*—
Perry, Phillip J.; Meldrum, John A. D.; Metlikovec, Jordon; Bauer, Michael J.; and White, Clive S., 4,978,911, Cl. 324-142.000.

Baum, David M.; Bradshaw, Andrea E.; and McClain, Christopher G., to Motorola, Inc. Method of processing cellular telephone call detail data for billing multi-line customers for cellular telephone services. 4,979,207, Cl. 379-112.000.

Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, to International Business Machines Corporation. Multiple address space token designation, protection controls, designation translation and lookaside. 4,979,098, Cl. 364-200.000.

Baumann, Michael: *See*—
Vetter, Kurt; Baumann, Michael; and Hezel, Thomas, 4,977,911, Cl. 134-34.000.

Baur, Richard; Birnbach, Stefan; Oftring, Alfred; and Winkler, Ekhard, to BASF Aktiengesellschaft. Polyethers. 4,978,805, Cl. 568-622.000.

Baxter International, Inc.: *See*—
Leonard, Ronald J., 4,978,453, Cl. 210-636.000.
Rosenbaum, Larry A., 4,978,579, Cl. 428-483.000.

Bayan, Ghawamedin; and Esposito, Anthony S., to West Company Incorporated, The. Modified halobutyl thermoplastic elastomer. 4,978,714, Cl. 525-69.000.

Bayer Aktiengesellschaft: *See*—
Fiedler, Paul; Buding, Hartmuth; and Braden, Rudolf, 4,978,771, Cl. 558-459.000.
Herd, Karl-Josef, 4,978,746, Cl. 534-632.000.
Kohler, Burkhard; and Heinz, Hans-Detlef, 4,978,729, Cl. 525-537.000.
Kraatz, Udo; Kysela, Ernst; Hartwig, Jurgen; and Becker, Benedikt, 4,978,382, Cl. 71-92.000.
Kysela, Ernst; and Braden, Rudolf, 4,978,769, Cl. 558-423.000.
Selbeck, Harald; Horsthemke, August; Bockmann, August; and Weber, Frank, 4,978,743, Cl. 528-499.000.
Weber, Karl-Arnold; Henk, Hermann; Kunde, Klaus; Westphal, Jochen; and Wunderlich, Klaus, 4,978,747, Cl. 534-735.000.
Wehrmann, Rolf; Schopper, Heinrich-Christian; and Nerger, Dittmar K., 4,978,732, Cl. 528-71.000.

Bayerische Motoren Werke Aktiengesellschaft: *See*—
Kleefeldt, Frank; Menke, Johannes T.; and Kostler, Ulrich, 4,978,154, Cl. 292-201.000.

Bayley, Brian J.; Brosnan, Michael J.; and Hochgraf, Neil, to Hewlett-Packard Company. Optical system for a large depth-of-field bar code scanner. 4,978,860, Cl. 250-568.000.

Bean, Andrew S.: *See*—
Brannan, James R.; Bean, Andrew S.; Vaccaro, Anthony J.; and Stewart, James J., 4,978,431, Cl. 204-28.000.

Beattie, Patrick J.; Oliveri, Andrew L.; and Sylvester, Richard J., to John D. Brush & Co., Inc. Universal lock mount. 4,977,766, Cl. 70-326.000.

Beausoleil, Raymond G.; Hagman, Ronald L.; and McGarvey, John A., to Boeing Company, The. Tunable narrow-linewidth semiconductor laser. 4,979,178, Cl. 372-20.000.

Beck, Rodger W.: *See*—
Menon, Krishna S.; and Beck, Rodger W., 4,978,550, Cl. 426-549.000.

Becker, Benedikt: *See*—
Kraatz, Udo; Kysela, Ernst; Hartwig, Jurgen; and Becker, Benedikt, 4,978,382, Cl. 71-92.000.

Becker, Klaus; and Ostholt, Rudiger, to Mannesmann Aktiengesellschaft. Fastening element with expanding sleeve. 4,978,266, Cl. 411-61.000.

Becton, Dickinson and Company: *See*—
Wagner, Daniel B.; Vonk, Glenn P.; and Mercolino, Thomas J., 4,978,625, Cl. 436-518.000.

Beghin-Say SA: *See*—
Pigneul, Raymond; Ruppel, Remy; and Laurent, Pierre, 4,978,565, Cl. 428-156.000.

Behlmann, Marianne: *See*—
Behlmann, Timothy J.; and Behlmann, Marianne, 4,978,023, Cl. 220-23.600.

Behlmann, Timothy J.; and Behlmann, Marianne. Insulated modular cooler. 4,978,023, Cl. 220-23.600.

Behr Industrieanlangen GmbH & Co.: *See*—
Vetter, Kurt; Baumann, Michael; and Hezel, Thomas, 4,977,911, Cl. 134-34.000.

Behr, Paul A.: *See*—
Evans, Andrew L.; and Behr, Paul A., 4,977,644, Cl. 452-195.000.

Belanger, Inc.: *See*—
Belanger, James A.; Wentworth, Robert J.; and Astley, Graham J., 4,977,689, Cl. 34-243.00C.

Belanger, James A.; Wentworth, Robert J.; and Astley, Graham J., to Belanger, Inc. Side nozzle tracer system. 4,977,689, Cl. 34-243.00C.

Bell, Conrad J., to Xerox Corporation. Crossmixing dual auger system. 4,978,997, Cl. 355-253.000.

Bell, Louis: *See*—
Wellington, Robert; and Bell, Louis, 4,978,256, Cl. 408-72.00R.

Bell, Malcolm R., to Sterling Drug Inc. 3-arylcarbonyl- and 3-cycloalkyl-carbonyl-1-aminoalkyl-1H-indole pharmaceutical compositions. 4,978,664, Cl. 514-235.200.

Bell, Weldon K.; and Haag, Werner O., to Mobil Oil Corp. Conversion of synthesis gas to liquid hydrocarbons. 4,978,689, Cl. 518-709.000.

Beller, Jeffrey A.; Johnson, Ralph K.; Kammerer, Roger; Kaya, Azmi; and Keyes, Marion A., IV, to Elsag International B.V. Method for controlling the degree of cooking in a digester. 4,978,425, Cl. 162-49.000.

Bellot, Jean: *See*—
Pierson, Gilles; Payraudeau, Louis; and Bellot, Jean, 4,978,499, Cl. 420-87.000.

Beloit Corporation: *See*—
Cronin, Dennis C.; and Lange, David V., 4,978,428, Cl. 162-358.000.

Belou, Olivier: *See*—
Alquier, Bruno; Belou, Olivier; Devienne, Paul; and Martin, Thierry, 4,978,089, Cl. 244-129.500.

Bend Research, Inc.: *See*—
McCray, Scott B., 4,978,455, Cl. 210-654.000.

Bendix France: *See*—
Levrai, Roland; and Pascal, Le Normand, 4,978,820, Cl. 200-82.00D.

Benjamin, William P.: *See*—
Schmidt, Wayne W.; Benjamin, William P.; and Grimm, Robert A., 4,978,825, Cl. 219-104.300.

Benson, Clark K.; and Caridis, Andrew A., to Heat and Control, Inc. Automatic stirring of batch fried food products. 4,977,821, Cl. 99-348.000.

Bentley, Joseph R., to HGM Medical Laser Systems, Inc. Laser thermal probe. 4,978,346, Cl. 606-27.000.

Benvenuto, Nevio; and Goeddel, Thomas W., to AT&T Bell Laboratories. Classifier for high speed voiceband digital data modem signals. 4,979,211, Cl. 381-43.000.

Berce, Tatiana: *See*—
Boswell, Peter; Negaty-Hindi, Guy; and Berce, Tatiana, 4,977,947, Cl. 164-71.100.

Beretta, Pier G., to Fabbrica d'Armi P. Beretta S.p.A. Automatic safety device for fire arms. 4,977,814, Cl. 89-1.400.

Bergene, Mark A.; and Boe, Thomas E., to Deere & Company. Hitch control system. 4,979,092, Cl. 364-148.000.

Berger, Harvey L.; Paul, Alan; and Broe, William J., to Sono-Tek Corporation. Unitary axial flow tube ultrasonic atomizer with enhanced sealing. 4,978,067, Cl. 239-102.200.

Berger, Siegbert; Kurz, Karl; and Mayer, Alfred, to Maschinenfabrik Reinhausen GmbH. Load selector for step transformers. 4,978,815, Cl. 200-11.0TC.

Berghof, Hans-Joachim: *See*—
Pelz, Herbert; Kluting, Bernd; Wagener, Heinz-Jurgen; and Berghof, Hans-Joachim, 4,978,170, Cl. 297-411.000.

Bernard Fried Racing Enterprises: *See*—
Letovsky, Howard; and Fried, Bernard, 4,978,300, Cl. 434-61.000.

Bernardi, Riccardo: *See*—
Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., 4,978,673, Cl. 514-411.000.

Bernstein, Philip: *See*—
Kamen, Melvin E.; Bernstein, Philip; and Defazio, Augustine, 4,978,524, Cl. 424-64.000.

Berresheim, Alexander, to Messerschmitt-Bolkow-Blohm GmbH. Apparatus for digital conversion and processing of analog inertial velocity or acceleration signals. 4,978,956, Cl. 341-155.000.

Berrong, David B.: *See*—
Schuchart, Thomas L.; and Berrong, David B., 4,978,102, Cl. 251-324.000.

Besemann, Alfred, to E.C.H. Will GmbH. Apparatus for adjusting the positions of components in machines. 4,977,788, Cl. 74-424.80R.

Besser Company: *See*—
Wallace, Mark P., 4,978,488, Cl. 264-72.000.

Bessho, Yoshinori, to Brother Kogyo Kabushiki Kaisha. Surface roughness measuring apparatus utilizing deflectable laser beams. 4,978,219, Cl. 356-349.000.

Bessone, Carlo S.: *See*—
Bouchard, Andre C.; and Bessone, Carlo S., 4,978,180, Cl. 315-73.000.

Best, Albert M. Dust collection apparatus. 4,977,638, Cl. 15-301.000.

Betts, William L.: *See*—
Bottoms, Stanley; Betts, William L.; and Martinez, Kenneth, 4,979,184, Cl. 375-13.000.

Bezjak, Greg W.: *See*—
Martz, Donald R.; and Bezjak, Greg W., 4,979,232, Cl. 455-78.000.

Bialy, Louis; Cooney, Anthony; Sheridan, William; and Reiskin, Edward, to Otis Elevator Company. Elevator sheave brake safety. 4,977,982, Cl. 187-89.000.

Bieg, Lothar F., to United States of America, Energy. Non-contact contour gage. 4,977,777, Cl. 73-37.500.

Bieniarz, Christopher; Cornwell, Michael J.; and Young, Douglas F., to Abbott Laboratories. Beta-lactamase assay employing chromogenic precipitating substrates. 4,978,613, Cl. 435-18.000.

Billman, Timothy B.; and Taylor, Attalee S., to AMP Incorporated. Electrical socket for substrates. 4,978,307, Cl. 439-83.000.

Billman, Timothy B.; and Thrush, Roger L., to AMP Incorporated. Switch for integrated circuit package. 4,978,822, Cl. 200-302.100.

Binder, Dieter; Rovenszky, Franz; and Ferber, Hubert P., to Chemisch Pharmazeutische Forschungsgesellschaft m.b.H. Thieno (3',4'-4,5)imidazo(2,1-b)thiazole derivatives, a process for their preparation and their use in medicaments. 4,978,671, Cl. 514-366.000.

Binney & Smith Inc.: *See*—
Snedeker, Colin M., 4,978,390, Cl. 106-19.000.

Bio Serae Laboratoires S.A.: *See*—
Degre, Francois, 4,978,528, Cl. 424-94.400.

Biomagnetic Technologies, Inc.: *See*—
Robinson, Stephen E.; and Black, William C., Jr., 4,977,896, Cl. 128-653.00R.

Biomat Feeding Systems, Inc.: *See*—
Langballe, Logan C.; Koszewa, Bernhard; and Blicher, Steen, 4,977,858, Cl. 119-51.500.

Birnbach, Stefan: *See*—
Baur, Richard; Birnbach, Stefan; Oftring, Alfred; and Winkler, Ekhard, 4,978,805, Cl. 568-622.000.

Birot, Patrice: *See*—
Fontanes, Sylvain; Birot, Patrice; Marguinaud, Andre ; Quignon, Thierry; and Romann, Brigitte, 4,979,215, Cl. 381-49.000.

Bisbing, Robert H., to Southco, Inc. Slam-action latch with ejector spring. 4,978,152, Cl. 292-169.000.

Bischof, Horst; and Trinkaus, Gerhard, to Koflach Sport Gesellschaft mbH & Co. KG. Device for damping and limiting the tilting action of the cuff relative to the shell of a ski boot. 4,977,693, Cl. 36-120.000.

Bissinger, Fridolin; Krzyzanowski, Erich; and Wittmoser, Adalbert, to Grunzweig and Hartmann und Glasfaser AG. Full mold comprised of a plastic foam material. 4,977,945, Cl. 164-235.000.

Bitner, Robert S.: *See*—
Barchas, Jack D.; Elliott, Glen R.; Adriaenssens, Peter I.; Bitner, Robert S.; Bowersox, Stephen S.; and Nadasdi, Laszlo, 4,978,669, Cl. 514-292.000.

Biton, Jacques; Gellf, Gerard; Michel, Jean-Marc; Paul, Francois B.; and Monsan, Pierre F., to Roussel-Ulcaf. Low-calorie sweeteners of fructosyl oligosaccharides and the food or dietetic products or drinks containing them. 4,978,751, Cl. 536-123.000.

Black, William C., Jr.: *See*—
Robinson, Stephen E.; and Black, William C., Jr., 4,977,896, Cl. 128-653.00R.

Blanc, Chris. Plant soil protector. 4,977,703, Cl. 47-84.000.

Blanchard, Richard A., to Siliconix Incorporated. Current source with a process selectable temperature coefficient. 4,978,631, Cl. 437-24.000.

Blanchard, Robert R.: *See*—
Flynn, James H.; Ainsworth, Oliver C.; and Blanchard, Robert R., 4,978,716, Cl. 525-195.000.

Bley, Michael E., to Golden Valley Microwave Foods, Inc. Method for de-vitalizing seed. 4,978,555, Cl. 426-627.000.

Blicher, Steen: *See*—
Langballe, Logan C.; Koszewa, Bernhard; and Blicher, Steen, 4,977,858, Cl. 119-51.500.

Blizzard, Timothy A.; Mrozik, Helmut; Marino, Gaye; and Sinclair, Peter J., to Merck & Co., Inc. Synthetic derivatives of paraherquamide. 4,978,656, Cl. 514-63.000.

Blom, Lawrence E., to Paper Converting Machine Company. Saw mechanism for logs convolutely wound on cores and method. 4,977,803, Cl. 83-23.000.

Blonder, Greg E.; Henry, Charles H.; Kazarinov, Rudolf F.; and Wolfe, Raymond, to AT&T Bell Laboratories. Hybrid optical isolator, circulator or switch, and systems utilizing same. 4,978,189, Cl. 350-96.120.

Bloom, Elbert: *See*—
Triolo, Victoria M.; Bloom, Elbert; and Hartwell, David W., 4,979,097, Cl. 364-200.000.

Blosseville, Patrick; and Dubrac, Claude, to Vieille Montagne France S.A. Rigid covering for roofs and supports therefor. 4,977,721, Cl. 52-410.000.

Blue, John Duncan. Color coded flavored dentifrice toothpowders. 4,978,521, Cl. 424-7.100.

Blum, Joseph M.: *See*—
Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., 4,978,421, Cl. 156-645.000.

Bluthe, Norbert; and Perron, Robert, to Rhone-Poulenc Chimie. Preparation of aromatic aldehydes. 4,978,801, Cl. 568-428.000.

Bly, Lloyd G.: *See*—
Farrell, Kenneth L.; Cona, John A.; Glugla, Ronald; and Bly, Lloyd G., 4,977,838, Cl. 110-173.00R.

Board of Regents, The University of Texas System: *See*—
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Bober, James K.: *See*—
Ellsworth, Roger D.; Richards, William A.; Samuels, James T.; and Bober, James K., 4,978,858, Cl. 250-560.000.

Bobyn, John D., to Zimmer Inc. Orthopaedic prosthetic device possessing improved composite stem design. 4,978,358, Cl. 623-23.000.

Bock, Erich: *See*—
Himmert, Rainer; Brand, Heinrich; Dommer, Josef; and Bock, Erich, 4,978,088, Cl. 244-3.240.

Bock, Jan; Canevari, Gerard P.; and Robbins, Max L., to Exxon Research and Engineering Company. Oil spill microemulsion dispersants. 4,978,459, Cl. 210-749.000.

Bockmann, August: *See*—
Selbeck, Harald; Horsthemke, August; Bockmann, August; and Weber, Frank, 4,978,743, Cl. 528-499.000.

Bodkin, Lawrence E. Automatic reset circuit for GFCI. 4,979,070, Cl. 361-42.000.

Boe, Thomas E.: *See*—
Bergene, Mark A.; and Boe, Thomas E., 4,979,092, Cl. 364-148.000.

Boeing Company, The: *See*—
Beausoleil, Raymond G.; Hagman, Ronald L.; and McGarvey, John A., 4,979,178, Cl. 372-20.000.
Bond, David G.; Hill, Todd; Weis, Paul D.; and Woods, John R., 4,979,191, Cl. 375-108.000.
Capps, C. David, 4,978,950, Cl. 340-783.000.
Ghaffari, Mehrdad, 4,979,095, Cl. 364-200.000.
Schoot, Peter A., 4,978,150, Cl. 285-304.000.
Westerman, Everett A., Jr., 4,978,404, Cl. 156-098.000.

Boes, David J.: *See*—
Eiffler, Elmer E.; Iyer, Natraj C.; Male, Alan T.; and Boes, David J., 4,978,487, Cl. 264-60.000.

Boger, Joshua S.: *See*—
Rupprecht, Kathleen M.; and Boger, Joshua S., 4,978,679, Cl. 514-468.000.

Boissevain, Mathew G., to Measurex Corporation. Drip free steambox. 4,977,687, Cl. 34-51.000.

Bond, David G.; Hill, Todd; Weis, Paul D.; and Woods, John R., to Boeing Company, The. Autonomous N-modular redundant fault tolerant clock system. 4,979,191, Cl. 375-108.000.

Bond, Irvin D. Parts stacking pallet. 4,977,836, Cl. 108-55.100.

Bonfiglioli, Silverio; and Fato, Massimo, to Weber S.r.l. System for converting a signal from a linear transducer for enabling parameter acquisition to varying degrees of accuracy. 4,977,880, Cl. 123-488.000.

Bonomi, Jaime, to Bostec Systems, Inc. Card assembly method. 4,978,401, Cl. 156-64.000.

Boone, Mark B.: *See*—
Sun, Jim C.; Boone, Mark B.; Dunbar, James J.; and Weedon, Gene C., 4,978,492, Cl. 264-180.000.
Borden, Scott C.: *See*—
Newcomb, Gary L.; Brandt, Timothy E.; Borden, Scott C.; and Stevenson, Joseph, 4,978,960, Cl. 342-25.000.
Borden, Terry L.: *See*—
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.
Borgo-Nova SpA: *See*—
Ongetta, Renato, 4,977,874, Cl. 123-269.000.
Borom, Marcus P.: *See*—
Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,978,039, Cl. 222-592.000.
Borrousch, Eugene W.; and Green, Frank R., to General Motors Corporation. Differential pressure, countergravity casting of individual charges of melt from a casting basin. 4,977,946, Cl. 164-57.100.
Bos, Philip J.: *See*—
Rumbaugh, Scott H.; Jones, Michael D.; and Bos, Philip J., 4,979,235, Cl. 455-616.000.
Bostec Systems, Inc.: *See*—
Bonomi, Jaime, 4,978,401, Cl. 156-64.000.
Boston Auto Security, Inc.: *See*—
Kaplan, Neil B., 4,978,940, Cl. 340-426.000.
Boswell, Peter; Negaty-Hindi, Guy; and Berce, Tatiana, to Battelle Memorial Institute. Method and a device for homogenizing the intimate structure of metals and alloys cast under pressure. 4,977,947, Cl. 164-71.100.
Bottoms, Stanley; Betts, William L.; and Martinez, Kenneth, to A.T. & T. Paradyne. Automatic equalizer initialization time control for multipoint networks. 4,979,184, Cl. 375-13.000.
Bouchard, Andre C.; and Bessone, Carlo S., to GTE Products Corporation. Tri-model type circuit breaker and rapid-start fluorescent lamp containing same. 4,978,180, Cl. 315-73.000.
Bowersox, Stephen S.: *See*—
Barchas, Jack D.; Elliott, Glen R.; Adriaenssens, Peter I.; Bitner, Robert S.; Bowersox, Stephen S.; and Nadasdi, Laszlo, 4,978,669, Cl. 514-292.000.
Bowley, Roger M.: *See*—
Mansfield, Peter; Chapman, Barry L. W.; Turner, Robert; and Bowley, Roger M., 4,978,920, Cl. 324-318.000.
Bowman, Robert M.; Steele, Ronald E.; and Browne, Leslie, to Ciba-Geigy Corporation. Alpha-heterocyclc substituted tolunitriles. 4,978,672, Cl. 514-383.000.
Bowman, Worth D.: *See*—
Barbera, Melvin A.; Agricola, Francis O.; Faller, Robert V.; and Bowman, Worth D., 4,978,522, Cl. 424-52.000.
Boyle, Dennis J.: *See*—
Herron, Matthew A.; and Boyle, Dennis J., 4,978,949, Cl. 340-711.000.
Braden, Rudolf: *See*—
Fiedler, Paul; Buding, Hartmuth; and Braden, Rudolf, 4,978,771, Cl. 558-459.000.
Kysela, Ernst; and Braden, Rudolf, 4,978,769, Cl. 558-423.000.
Bradshaw, Andrea E.: *See*—
Baum, David M.; Bradshaw, Andrea E.; and McClain, Christopher G., 4,979,207, Cl. 379-112.000.
Brais, Joseph E., to Joss Company. Circular loom for weaving ribbon-shaped materials. 4,977,933, Cl. 139-459.000.
Braly, Sam: *See*—
Hansen, Andrew H.; Walker, William C.; Walker, Richard K.; and Braly, Sam, 4,978,508, Cl. 422-186.080.
Brand, Heinrich: *See*—
Himmert, Rainer; Brand, Heinrich; Dommer, Josef; and Bock, Erich, 4,978,088, Cl. 244-3.240.
Brandt, Timothy E.: *See*—
Newcomb, Gary L.; Brandt, Timothy E.; Borden, Scott C.; and Stevenson, Joseph, 4,978,960, Cl. 342-25.000.
Brannan, James R.; Bean, Andrew S.; Vaccaro, Anthony J.; and Stewart, James J., to Eltech Systems Corporation. Continuous electroplating of conductive foams. 4,978,431, Cl. 204-28.000.
Brannon, Paul J.; and Cowgill, Donald F., to United States of America, Energy. Laser-triggered vacuum switch. 4,978,893, Cl. 315-150.000.
Brannon, Paul J.: *See*—
Arnold, George W., Jr.; Ashby, Carol I. H.; and Brannon, Paul J., 4,978,418, Cl. 156-628.000.
Branz, Michael A.: *See*—
Upton, Ronald D.; Branz, Michael A.; and Richardson, Edmund S., 4,977,754, Cl. 62-248.000.
Braun, Heinz-Hubert: *See*—
Gonner, Sigmar; and Braun, Heinz-Hubert, 4,977,940, Cl. 144-255.000.
Brehm, Claude; Ramos, Josiane; and Dupont, Philippe, to Alcatel N.V. Method of assembling a fiber optic preform from discrete preformed elements. 4,978,377, Cl. 65-3.110.
Breno, Philip J.: *See*—
Potter, Terry; Breno, Philip J.; and Bright, Lyn E., 4,978,416, Cl. 156-571.000.
Brentwood Enterprises, Ltd.: *See*—
Littke, Mark E., 4,977,796, Cl. 74-665.00T.
Bretz, Franklin E. Trucker's bed. 4,977,631, Cl. 5-118.000.
Brewster, Steven L.: *See*—
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,978,571, Cl. 428-263.000.
Bridgestone Construction: *See*—
Fukahori, Yoshihide; Kojima, Hiromu; and Ogino, Akihiko, 4,978,581, Cl. 428-492.000.
Briet, Gilles: *See*—
Potier, Michel; and Briet, Gilles, 4,977,954, Cl. 165-76.000.
Briggs & Stratton Corporation: *See*—
Dykstra, Richard A., 4,977,877, Cl. 123-335.000.
Schmidt, Gregory R.; and Hotz, Peter, 4,977,879, Cl. 123-376.000.
Bright, Lyn E.: *See*—
Potter, Terry; Breno, Philip J.; and Bright, Lyn E., 4,978,416, Cl. 156-571.000.
Brighton, Jeffrey E., to Texas Instruments Incorporated. VLSI self-aligned bipolar transistor. 4,979,010, Cl. 357-34.000.
Brink, Robert H.; and Tseng, Chi-Ming, to Minnesota Mining and Manufacturing Company. Film-forming emulsion containing iodine and methods of use. 4,978,527, Cl. 424-78.000.
Brinton, Alice R. Vehicle in distress flag. 4,977,849, Cl. 116-28.00R.
Briot International: *See*—
Langlois, Jean-Pierre M. F.; and Lecerf, Michel J. M., 4,978,254, Cl. 407-33.000.
Britax-Kolb GmbH & Co.: *See*—
Tauber, Erhard, 4,978,087, Cl. 242-107.40A.
British-American Tobacco Company: *See*—
Luke, John A., 4,977,908, Cl. 131-375.000.
Broadwin, Alan; and Kleesattel, Claus, to Valleylab, Inc. Resonator for surgical handpiece. 4,978,333, Cl. 604-22.000.
Brock, James A., to Walton Enterprises, Inc. Evaporative air cooler. 4,977,756, Cl. 62-314.000.
Brodeur, Lester. Landing aid for aircraft. 4,979,154, Cl. 367-116.000.
Broe, William J.: *See*—
Berger, Harvey L.; Paul, Alan; and Broe, William J., 4,978,067, Cl. 239-102.200.
Brondsema, Philip J.: *See*—
Koster, Robert A.; Brondsema, Philip J.; Pennington, Willis J.; Sumner, William C.; and Vilmer, Susan E., 4,978,811, Cl. 568-734.000.
Bronstein, Irena Y., to Tropix, Inc. Method of detecting a substance using enzymatically-induced decomposition of dioxetanes. 4,978,614, Cl. 435-21.000.
Brookfield, Richard A. Surveillance apparatus. 4,978,984, Cl. 354-81.000.
Brosnan, Michael J.: *See*—
Bayley, Brian J.; Brosnan, Michael J.; and Hochgraf, Neil, 4,978,860, Cl. 250-568.000.
Brother Kogyo Kabushiki Kaisha: *See*—
Bessho, Yoshinori, 4,978,219, Cl. 356-349.000.
Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; Ichihara, Yukio; and Sasaki, Toshio, 4,977,842, Cl. 112-199.000.
Yokoi, Takeshi, 4,978,112, Cl. 271-9.000.
Brown, Daniel M., to Air Chex, Inc. Low tire pressure detector. 4,978,941, Cl. 340-447.000.
Brown, Dennis M.: *See*—
Luck, Edward E.; and Brown, Dennis M., 4,978,332, Cl. 604-19.000.
Brown, Edward E. Locking device for automobiles. 4,977,974, Cl. 70-226.000.
Brown, Herbert C., to Aldrich Chemical Company, Inc. Novel β-(2-alkenyl)bis(2-isocaranyl)boranes. 4,978,794, Cl. 568-1.000.
Brown International Corporation: *See*—
Bushman, Ronald C.; and Harris, William E., Jr., 4,978,010, Cl. 209-663.000.
Brown, Robert L.; Shilen, Robert D.; and Rosnak, Robert F., to Quaker Oats Company, The. Marble shooting toy. 4,978,124, Cl. 273-129.00S.
Brown, Sterling B.; McFay, Dennis J.; Yates, John B., III; and Lee, Gim F., to General Electric Company. Solvent-resistant, compatible blends of polyphenylene ethers and linear polyesters. 4,978,715, Cl. 525-92.000.
Brownawell, Darrell W.; Norris, Donald J.; and Shaub, Harold, to Exxon Chemical Patents, Inc. Removal of carcinogenic hydrocarbons from used lubricating oil using activated carbon. 4,977,871, Cl. 123-196.00A.
Browne, Leslie: *See*—
Bowman, Robert M.; Steele, Ronald E.; and Browne, Leslie, 4,978,672, Cl. 514-383.000.
Brownell, David J., to Honeywell Inc. Semiconductor device with bonding pad contacts. 4,979,012, Cl. 357-40.000.
Bruce Grainger: *See*—
Grainger, Oswald J., 4,977,731, Cl. 52-747.000.
Bruce, James A.; Kerbaugh, Michael L.; Kwong, Ranee W.; Lee, Tanya N.; Linde, Harold G.; and Sachdev, Harbans S., to International Business Machines Corporation. Fluorine-containing base layer for multi-layer resist processes. 4,978,594, Cl. 430-14.000.
Bruce, Richard L. Disguised beam-break security system. 4,978,942, Cl. 340-556.000.
Bruckner, Raimund: *See*—
Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, 4,978,108, Cl. 266-220.000.
Brufani, Mario: *See*—
Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., 4,978,673, Cl. 514-411.000.
Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., to General Electric Company. Transfer tube with insitu heater. 4,978,039, Cl. 222-592.000.

Brunswick Corporation: *See*—
Lulloff, Ricky H.; Ruhnke, Jeffrey P.; and Lloyd, Robert C., 4,977,741, Cl. 60-310.000.

Bruzzi, Vittorio: *See*—
Messina, Giuseppe; Sechi, Giovanni; Lorenzoni, Loreno; and Bruzzi, Vittorio, 4,978,786, Cl. 564-160.000.

Bryans, Mark A.; Cline, James H.; Frazee, Francis B.; and Lehman, Lark E., to Texas Instruments Incorporated. High speed serial data link. 4,979,185, Cl. 375-20.000.

Bryson, Robert A., Sr.: *See*—
Chandhoke, Mohanijit S.; and Bryson, Robert A., Sr., 4,977,827, Cl. 100-7.000.

BS&B Safety Systems, Inc.: *See*—
Finnegan, Michael C., 4,978,947, Cl. 340-611.000.

Bucci, Paolo: *See*—
Casini, Alessandro; Parti, Sandro; and Bucci, Paolo, 4,978,772, Cl. 560-45.000.

Buchanan, Douglas R., to Du Pont Canada Inc. Method and apparatus for making composite yarn. 4,977,739, Cl. 57-293.000.

Buchanan, John S.; and Schoennagel, Hans J., to Mobil Oil Corp. Laboratory FCC riser and particulate delivery system therefor. 4,978,441, Cl. 208-113.000.

Buchner, James D.: *See*—
Willoughby, Ross C.; and Buchner, James D., 4,977,785, Cl. 73-863.120.

Buckholz, Lawrence, Jr.: *See*—
Stypula, Richard J.; and Buckholz, Lawrence, Jr., 4,978,541, Cl. 426-92.000.

Buckley, John T. Method for preparing food having reduced fat content. 4,978,542, Cl. 426-243.000.

Budd, Jeffrey R., to University of Minnesota, Regents of the. Fitting and tuning chest compression device. 4,977,889, Cl. 128-30.200.

Buding, Hartmuth: *See*—
Fiedler, Paul; Buding, Hartmuth; and Braden, Rudolf, 4,978,771, Cl. 558-459.000.

Budnik, Viktor P.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Buhler GmbH: *See*—
Gorlitz, Frank-Otto; and Rusch, Friedrich-Wilheim, 4,978,011, Cl. 209-694.000.

Bull HN Information Systems Inc.: *See*—
Holtey, Thomas O.; Murray, Thomas L., Jr.; Perzan, Wayne A.; and Smith, Scott W., 4,979,104, Cl. 364-200.000.

Bull S.A.: *See*—
Combettes, Christian; and Lefebvre, Rene , 4,978,916, Cl. 324-212.000.

Buller, Marvin L.; McNelis, Barbara J.; and Snyder, Campbell H., to International Business Machines Corporation. Method for attaching heat sink to plastic packaged electronic component. 4,978,638, Cl. 437-209.000.

Bullwinkel, Edward P.: *See*—
Walker, Hilary; and Bullwinkel, Edward P., 4,978,364, Cl. 8-645.000.

Bulso, Joseph D., Jr.; and McClung, James A., to Redicon Corporation. Method and apparatus for forming reforming and curling shells in a single press. 4,977,772, Cl. 72-336.000.

Bunn-O-Matic Corporation: *See*—
Knepler, John T., 4,978,833, Cl. 392-449.000.

Buote, William J., to Zymark Corporation. Angular position measurement apparatus. 4,978,846, Cl. 250-231.130.

Burchill, Michael T.: *See*—
Silbermann, Joseph; and Burchill, Michael T., 4,978,576, Cl. 428-409.000.

Burd, Wayne D., to Koller Enterprises, Inc. Dispensing valve. 4,978,036, Cl. 222-207.000.

Burford, Russell L.; and Newkirk, Raymond K., to Forward Technology Industries, Inc. Method for heat sealing thermoplastic articles. 4,978,408, Cl. 156-281.000.

Burkhardt, Gary L.: *See*—
Kwun, Hegeon; and Burkhardt, Gary L., 4,979,125, Cl. 364-507.000.

Buschmann, Hans-Theo: *See*—
Roche, Edouard; Himmelmann, Wolfgang; Buschmann, Hans-Theo; and Quambusch, Heinz, 4,978,607, Cl. 430-642.000.

Bush, Gregory F.; Keener, Don S.; Morel, Jeanne E.; and Voorhees, Richard W., to International Business Machines Corporation. Increasing options in mapping ROM in computer memory space. 4,979,148, Cl. 365-230.010.

Bushman, Ronald C.; and Harris, William E., Jr., to Brown International Corporation. Fruit sizing apparatus. 4,978,010, Cl. 209-663.000.

Bussmann, Hans: *See*—
Arnosti, Hansjorg; and Bussmann, Hans, 4,977,984, Cl. 187-134.000.

Butot, Lucas A.: *See*—
DeRuiter, J. W.; and Butot, Lucas A., 4,978,826, Cl. 219-10.810.

Butwell, Justin R.: *See*—
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mail, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

BW Hydraulik GmbH: *See*—
Kuttruf, Werner, 4,977,816, Cl. 91-375.00R.

Byers, Charles H.: *See*—
Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., 4,978,647, Cl. 502-7.000.

Cabanas, Julian: *See*—
Garrido, Alfonso; Sevilleja, Jose; and Cabanas, Julian, 4,977,983, Cl. 187-95.000.

Cacheris, William P.: *See*—
Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, 4,978,763, Cl. 556-50.000.

Cahill, James E.: *See*—
Adiutori, Eugene F.; and Cahill, James E., 4,978,230, Cl. 374-43.000.

Calderwood, Andrew S., to Westinghouse Electric Corp. Corrosion product monitoring method and system. 4,978,506, Cl. 422-73.000.

Camco International Inc.: *See*—
Pringle, Ronald E., 4,977,957, Cl. 166-321.000.

Campana, Thomas J.: *See*—
Andros, Andrew A.; and Campana, Thomas J., 4,978,944, Cl. 340-825.440.

Campo, Philippe; Cocolios, Panayotis; Dognin, Paul; and Ledon, Henry, to L'Air Liquide, Socicte Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for production of aromatic aldehydes. 4,978,802, Cl. 568-432.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government: *See*—
Langford, Gordon E., 4,978,806, Cl. 568-667.000.

Canadian Occidental Petroleum Ltd.: *See*—
Gregoli, Armand A.; Hamshar, John A.; Olah, Andrew M.; Riley, Christopher J.; and Rimmer, Daniel P., 4,978,365, Cl. 44-301.000.

Canestri, Giuseppe. Polymeric dispersing agent. 4,978,395, Cl. 106-499.000.

Canevari, Gerard P.: *See*—
Bock, Jan; Canevari, Gerard P.; and Robbins, Max L., 4,978,459, Cl. 210-749.000.

Canon Kabushiki Kaisha: *See*—
Aoki, Akio; and Ishii, Yoshiki, 4,979,187, Cl. 375-27.000.
Ishikawa, Noriyoshi; Inui, Toshiharu; Tamura, Yasuyuki; and Harada, Toshiaki, 4,978,968, Cl. 346-1.100.
Kitani, Koji, 4,978,882, Cl. 310-328.000.
Murakami, Koichi; and Hiroi, Masakazu, 4,978,045, Cl. 227-1.000.
Nakahara, Toshiaki; and Tanikawa, Hirohide, 4,978,597, Cl. 430-122.000.
Noguchi, Akio; and Hashimoto, Hiroshi, 4,978,980, Cl. 346-150.000.
Saito, Hiroshi, 4,978,975, Cl. 346-108.000.
Sakai, Masanori, 4,979,027, Cl. 358-75.000.

Canpolar East Inc.: *See*—
Reimer, Ernest M., 4,978,225, Cl. 356-432.000.

Capozzi, Emil E.; and Cookston, H. Stephen, to Hemaedics, Inc. Biological syringe system. 4,978,336, Cl. 604-82.000.

Capps, C. David, to Boeing Company, The. Grey-scale representation using binary spatial light modulators in coherent optical processor. 4,978,950, Cl. 340-783.000.

Card, Roger J., to American Cyanamid Company. Vapor phase oxidation process for making glyoxal. 4,978,803, Cl. 568-486.000.

Carey Smith, Christopher M.; and Vreeswijk, Franciscus W. P., to U.S. Philips Corporation. Television motion detection arrangement. 4,979,036, Cl. 358-105.000.

Caridis, Andrew A.: *See*—
Benson, Clark K.; and Caridis, Andrew A., 4,977,821, Cl. 99-348.000.

Carlson, Michael G., to Western Forms, Inc. Chamfer strip and adjustable corner squaring strip for a concrete column form. 4,978,099, Cl. 249-48.000.

Carlsson, Charlotte: *See*—
Segerstad, Sverker H. A.; Carlsson, Charlotte; and Mizeraczyk, Jerzy, 4,979,179, Cl. 372-88.000.

Carnell, Peter J. H.; and Denny, Patrick J., to Imperial Chemical Industries PLC. Desulphurisation using solid sorbents. 4,978,439, Cl. 208-91.000.

Carobbi, Renato; and Innocenti, Franco. Process for preparing high-purity lactulose syrup and the syrup obtained. 4,978,397, Cl. 127-46.200.

Carp, Stuart L.; and Edwards, Allen P., to Hewlett-Packard Company. Tunable phase shifter having wide instantaneous bandwidth. 4,978,931, Cl. 333-28.00R.

Carpenter, Robert S.; Rodriguez, Ernesto M.; and Roden, Dennis J., to Minnesota Mining and Manufacturing Company. Folding arm for overhead projector. 4,978,218, Cl. 353-119.000.

Carr, Dodd S.: *See*—
Kim, Michael M.; and Carr, Dodd S., 4,978,601, Cl. 429-245.000.

Carter-Day Company: *See*—
Cashman, Stephen L.; and Commers, Edward L., 4,978,443, Cl. 209-684.000.

Carter-Wallace, Inc.: *See*—
Sofia, Robert D., 4,978,680, Cl. 514-534.000.

Carthage Machine Company: *See*—
Depuy, Garth D.; and Farrell, Eugene A., 4,977,939, Cl. 144-176.000.

Caruso, Innocenzo. Use of 6-halo-4-quinolone compounds and pharmaceutical compositions thereof for the preparation of a medicament for the therapeutical application in rheumatoid arthritis. 4,978,661, Cl. 514-224.500.

Casebolt, Scott C., to D.B. Industries, Inc. Double locking snap hook. 4,977,647, Cl. 24-599.500.

Cashman, Stephen L.; and Commers, Edward L., to Carter-Day Company. Separator disc. 4,978,443, Cl. 209-684.000.

Casini, Alessandro; Parti, Sandro; and Bucci, Paolo, to A. Menarini S.A.S. Utilization of otilonium bromide (DCI) for topical application in the gastrointestinal tract and related pharmaceutical formulation appropriate for such use. 4,978,772, Cl. 560-45.000.

Casio Computer Co., Ltd.: *See*—
Ino, Mayumi, 4,977,812, Cl. 84-634.000.

Casma S.p.A.: *See*—
Marinoni, Mario, 4,977,642, Cl. 16-257.000.

Casse, Pierre, to Valeo. Torsion damping device with peripheral resilient means, especially for automotive vehicles. 4,978,324, Cl. 464-68.000.

Castera, Jean-Paul: *See*—
Mage, Jean-Claude; Rolland, Jean-Luc; and Castera, Jean-Paul, 4,979,064, Cl. 360-125.000.

Castille, James. Light reflecting antenna ball. 4,978,964, Cl. 343-715.000.

Castonguay, Roger N.; and Morris, Robert A., to General Electric Company. Circuit breaker handle interlock arrangement. 4,978,816, Cl. 200-43.140.

Castro, Bertrand: *See*—
Jouin, Patrick; Nisato, Dino; and Castro, Bertrand, 4,978,759, Cl. 548-497.000.

Caterpillar Inc.: *See*—
Smith, Glenn G.; and Stapleton, Edward L., 4,977,928, Cl. 137-596.000.

Causse, Pierre; Graham, Peter; Maury, Bernard; and Walter, Jean-Claude, to Horlogerie Photographique Francaise Societe Anonyme. Piezoelectric capsule with flat supporting surface and resilient holding means. 4,978,880, Cl. 310-324.000.

Cauvy, Daniel: *See*—
Yves, Samuel; and Cauvy, Daniel, 4,978,776, Cl. 560-214.000.

Cavallerano, Alan P.: *See*—
Tsinberg, Mikhail; Cavallerano, Alan P.; and Basile, Carlo, 4,979,023, Cl. 358-31.000.

Cavro Scientific Instruments: *See*—
Laine, Donald D.; Rochte, Jerry E.; and Wolcott, Frederick C., 4,979,093, Cl. 364-167.010.

Cebry, Stephen E.: *See*—
Herbert, Edward; and Cebry, Stephen E., 4,978,906, Cl. 323-361.000.

Centocor, Inc.: *See*—
Schoemaker, Hubert J. P.; and Sun, Lee K., 4,978,745, Cl. 530-387.000.

Central Glass Company, Limited: *See*—
Maruta, Masamichi; and Wada, Tetsuo, 4,978,808, Cl. 568-707.000.

Central Plastics Company: *See*—
Eggleston, Dean E., 4,978,837, Cl. 219-497.000.

Centre National de la Recherche Scientifique: *See*—
Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, 4,978,749, Cl. 536-27.000.

Centre Technique de l'Industrie des Papiers, Cartons et Celluloses: *See*—
Sabater, Jacques; Kerneis, Jean C.; and Bauduin, Serge, 4,978,861, Cl. 250-571.000.

Cerami, Anthony; and Yamin, Michael A., to Rockefeller University, The. Method and agents for preventing staining of teeth. 4,978,684, Cl. 514-632.000.

Ceramics Process Systems Corporation: *See*—
Venkataswamy, Krishna; Waack, Richard; Novich, Bruce E.; and Halloran, John W., 4,978,643, Cl. 501-94.000.

Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P. Device for external magnetic abrasive machining of cylindrical components. 4,977,707, Cl. 51-18.000.

Chaffee, Robert B. Collapsible air bed. 4,977,633, Cl. 5-453.000.

Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, to N. V. Bekaert S.A. Steel substrate with metal coatings for the reinforcement of vulcanizable elastomers. 4,978,586, Cl. 428-625.000.

Champion Spark Plug Company: *See*—
Straub, Stephen W., 4,978,309, Cl. 439-126.000.

Chamzas, Christodoulos; and Duttweiler, Donald L., to AT&T Bell Laboratories. Efficient encoding/decoding in the decomposition and recomposition of a high resolution image utilizing its low resolution replica. 4,979,049, Cl. 358-426.000.

Chan, Kevin K.: *See*—
Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., 4,978,421, Cl. 156-645.000.

Chan, Simon S.: *See*—
Hua, Chang-Hwang; Chan, Simon S.; Day, Ding-Yuan S.; and Lee, Adrian C., 4,978,639, Cl. 437-230.000.

Chandhoke, Mohanijit S.; and Bryson, Robert A., Sr., to AM International Incorporated. Signature handling apparatus. 4,977,827, Cl. 100-7.000.

Chandley, George D., to General Motors Corporation. Countergravity casting apparatus and method using elastomeric sealing gasket and cooled vacuum chamber. 4,977,948, Cl. 164-255.000.

Chaplin, John B.; Moore, Robert G.; and Ryken, John M., to Textron Inc. Surface effect ship engine mount system. 4,978,320, Cl. 440-052.000.

Chapman, Barry L. W.: *See*—
Mansfield, Peter; Chapman, Barry L. W.; Turner, Robert; and Bowley, Roger M., 4,978,920, Cl. 324-318.000.

Chapman, Gregory M., to Micron Technology, Inc. Out-of-tube inspection part holder. 4,977,993, Cl. 193-45.000.

Chapoy, L. Lawrence; Coassolo, Alfredo; and Foa, Marco, to Himont Italia S.r.l. Thermotropic liquid crystalline aromatic polyester from 3,3'-diphenyl-4,4'-dihydroxy diphenyl. 4,978,735, Cl. 528-193.000.

Charbonnel, Alain; and Foucher, Jean-Claude, to Societe Anonyme dite: Stein Industrie. Superheater bundle for a horizontal steam separator-superheater. 4,977,861, Cl. 122-483.000.

Charters, Werrett W., III. Under-cuff protective device. 4,977,625, Cl. 2-170.000.

Chase, Kent B. Automatic control device for indirect fired water heaters and heat exchangers. 4,978,063, Cl. 237-8.00R.

Chem Char Research, Inc.: *See*—
Larsen, David W.; and Manahan, Stanley E., 4,978,477, Cl. 252-626.000.

Chemical Research & Licensing Company: *See*—
Smith, Lawrence A., Jr., 4,978,807, Cl. 568-697.000.

Chemical Waste Management, Inc.: *See*—
Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., 4,977,839, Cl. 110-346.000.

Chemisch Pharmazeutische Forschungsgesellschaft m.b.H.: *See*—
Binder, Dieter; Rovenszky, Franz; and Ferber, Hubert P., 4,978,671, Cl. 514-366.000.

Chen, Alex. Device for facilitating the hammering of nail. 4,978,047, Cl. 227-147.000.

Chen, Ding B., to Audiovox International Limited. Integral body speaker with detachable terminal plate. 4,979,220, Cl. 381-192.000.

Chen, Fusen E.: *See*—
Liou, Fu-Tai; Lin, Yih-Shung; and Chen, Fusen E., 4,978,637, Cl. 437-193.000.

Chen, Ming-Daw; and Tu, Nang-Ping, to Industrial Technology Research Institute. CMOS digital level shifter circuit. 4,978,870, Cl. 307-475.000.

Chen, Robert K. T.; Jackson, Winslow E.; and Kim, Paul H. K., to Pitney Bowes Inc. Postage meter value card system. 4,978,839, Cl. 235-375.000.

Cheng, Ying; and Dravida, Subrahmanyam, to AT&T Bell Laboratories. Error correction and detection apparatus and method. 4,979,174, Cl. 371-41.000.

Cherry, Mark A.; and Elmore, Clifford L., to Elmore, Clifford L. Timing chamber ignition method and apparatus. 4,977,873, Cl. 123-267.000.

Cherukuri, Satyam C.: *See*—
Fister, Julius C.; Cherukuri, Satyam C.; Mahulikar, Deepak; and O'Donnelly, Brian E., 4,978,052, Cl. 228-123.000.

Chevron Research Company: *See*—
Avasthi, Jitendra M., 4,977,961, Cl. 166-297.000.
Ward, Carl E., 4,978,386, Cl. 71-121.000.

Chieng, C. K., to Hewlett-Packard Company. Method for printing using ultra-violet curable ink. 4,978,969, Cl. 346-1.100.

Chinnock, Robert T.; and McKenzie, Jeffrey J., to Fluoroware, Inc. Weir valve sampling/injection port. 4,977,929, Cl. 137-863.000.

Chizat, Francois, to Rhone-Poulenc Chimie. Diorganopolysiloxanes containing itaconate functional groups. 4,978,701, Cl. 524-265.000.

Cho, Chan-Dong. Pilot-controlled water pressure-operated diaphragm shut-off valve. 4,977,923, Cl. 137-414.000.

Cho, Hae S.: *See*—
Seo, Soon K.; and Cho, Hae S., 4,977,822, Cl. 99-348.000.

Choi, Frederick: *See*—
Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., 4,979,100, Cl. 364-200.000.

Chong, Chu P.; Smith, Kenneth C.; and Vranesic, Zvonko G., to University of Toronto Innovations Foundation. Analog to digital converter, a digital to analog converter and an operational amplifier therefor. 4,978,959, Cl. 341-161.000.

Chou, Fargo. Push-button type retractable brush. 4,977,909, Cl. 132-123.000.

Chou, Sen H. Spray can dispensing device incorporating gas pocket assembly. 4,978,033, Cl. 222-94.000.

Chow, Ho, to Hunter-melnor, Inc. Pulsating sprinkler. 4,978,070, Cl. 239-230.000.

Christidis, Yani, to Societe Francaise Hoechst. Process for industrial manufacture of sodium parahydroxymandelate. 4,978,784, Cl. 562-470.000.

Chrysler Corporation: *See*—
Humitz, John N.; Potter, Robert W.; and Kostrzewa, Kenneth J., 4,978,014, Cl. 211-195.000.
Shannon, Michael V.; and Wong, Peter Y. S., 4,978,169, Cl. 297-410.000.

Chung, Gishi: *See*—
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.

Ciancetta, Gary: *See*—
Markiewicz, W. Denis; Ciancetta, Gary; and Jonas, Philip, 4,978,936, Cl. 335-216.000.

Ciba-Geigy Corporation: *See*—
Babler, Fridolin, 4,978,755, Cl. 546-37.000.
Banks, Christopher P.; and Irving, Edward, 4,978,604, Cl. 430-327.000.

Bowman, Robert M.; Steele, Ronald E.; and Browne, Leslie, 4,978,672, Cl. 514-383.000.
Gass, Erfinders K.; Fory, Werner; Meyer, Willy; and Topfl, Werner, 4,978,383, Cl. 71-93.000.
Gehret, Jean-Claude, 4,978,677, Cl. 514-450.000.
Goldenberg, Merrill, 4,978,713, Cl. 525-61.000.
Janssen, Robert A.; McCraw, Earl C., Jr.; and Nicholson, Paul C., 4,978,481, Cl. 264-1.400.
von der Crone, Jost; Overney, Gonzague; and Dario, Peter, 4,978,768, Cl. 558-416.000.
Ciezarek, Krzysztof J.: *See—*
Hoffman, Jerzy; and Ciezarek, Krzysztof J., 4,978,935, Cl. 335-121.000.
Cimflex Teknowledge Corporation: *See—*
Abramovich, Abe; and Robertson, Gordon I., 4,978,220, Cl. 356-394.000.
Cincinnati Milacron Inc.: *See—*
Grimshaw, Michael N.; Albers, Stephen J.; and Rust, Ralph J., 4,978,417, Cl. 156-574.000.
Cincinnati-Vulcan Company: *See—*
Sturwold, Robert J., 4,978,465, Cl. 252-48.400.
Cirrus Logic, Inc.: *See—*
Geldman, John S.; and Estakhri, Petro, 4,979,173, Cl. 371-39.100.
Claar, Terry D.: *See—*
White, Danny R.; and Claar, Terry D., 4,978,644, Cl. 501-96.000.
Clark, Brian R., to Applied ImmuneSciences, Inc. Method of preparing derivatized polystyrene for spectroscopic studies. 4,978,724, Cl. 525-350.000.
Clark, Carl E.: *See—*
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mali, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.
Clark, David E.; and Krabill, Robert H., to University of Florida. Method for joining of prefired or fired ceramics using sol gels. 4,978,410, Cl. 156-325.000.
Clark, Joseph N.; Coble, David G.; and Kroupa, Loretta N., to Dow Corning Corporation. Optically clear organosiloxane adhesive compositions. 4,978,696, Cl. 523-212.000.
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Clayton, Donald L.; and Shah, Dinesh, to W. L. Gore & Associates, Inc. Electrical cable. 4,978,813, Cl. 174-117.00F.
Clifford, Ronald E., to Fountain Fresh, Inc. Pocket shaver. 4,977,669, Cl. 30-41.000.
Cline, James H.: *See—*
Bryans, Mark A.; Cline, James H.; Frazee, Francis B.; and Lehman, Lark E., 4,979,185, Cl. 375-20.000.
Clossey, Mary. Computer program for teaching land mass recognition. 4,978,302, Cl. 434-153.000.
Cloutier, Robert P.: *See—*
Smart, David C.; Cloutier, Robert P.; Pagano, Daniel M.; and Kirk, Duane B., 4,978,985, Cl. 354-275.000.
Coassolo, Alfredo: *See—*
Chapoy, L. Lawrence; Coassolo, Alfredo; and Foa, Marco, 4,978,735, Cl. 528-193.000.
Cobe Laboratories, Inc.: *See—*
Lobdell, Donn D., 4,978,446, Cl. 210-206.000.
Coble, David G.: *See—*
Clark, Joseph N.; Coble, David G.; and Kroupa, Loretta N., 4,978,696, Cl. 523-212.000.
Cocolios, Panayotis: *See—*
Campo, Philippe; Cocolios, Panayotis; Dognin, Paul; and Ledon, Henry, 4,978,802, Cl. 568-432.000.
Coe Manufacturing Company, The: *See—*
Ely, Gary W., 4,979,120, Cl. 364-474.090.
Cohen, Richard J.: *See—*
Albrecht, Paul; and Cohen, Richard J., 4,979,110, Cl. 364-413.030.
Coleman, Donald J., Jr.: *See—*
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.
Coleman, Michael D.; and Stadtfeld, Kerry W., to Von Duprin, Inc. Latch-operating mechanism for a panic egress device. 4,978,151, Cl. 292-21.000.
Cole's Quality Foods, Inc.: *See—*
Hogg, Howard, 4,978,013, Cl. 211-181.000.
Colgate-Palmolive Co.: *See—*
Dunton, David P., 4,978,232, Cl. 383-33.000.
Schuckmann, Alfred V., 4,978,037, Cl. 222-260.000.
Colin, Gerard; and Conroy, Michael, to La Compagnie Viticole et Fermiere Edmond et Benjamin de Rothschild S.A. Process for obtaining alcoholic beverages from vegetal juice. 4,978,539, Cl. 426-11.000.
Collier, Bertrand: *See—*
Masini, Jean-Jacques; and Collier, Bertrand, 4,978,435, Cl. 204-157.940.
Collimated Displays Incorporated: *See—*
Irwin, Dean S., 4,978,952, Cl. 340-795.000.
Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., to Keptel, Inc. Individual subscriber line module. 4,979,209, Cl. 379-399.000.
Columbus McKinnon Corporation: *See—*
McCraw, Clarence L., 4,977,646, Cl. 24-68.0CD.
Colvin, David S. Screwdriver blade construction. 4,977,800, Cl. 81-436.000.
Combe, Jean, to Institut Francais du Petrole. Method of positioning of plugs or screens by horizontal drilling. 4,977,959, Cl. 166-274.000.
Combettes, Christian; and Lefebvre, Rene , to Bull S.A. Method for magnetically characterizing the recording layer of a magnetic information carrier, and apparatus for performing the method. 4,978,916, Cl. 324-212.000.
Commander Electrical Materials, Inc.: *See—*
Nattel, William, 4,978,092, Cl. 248-205.100.
Commers, Edward L.: *See—*
Cashman, Stephen L.; and Commers, Edward L., 4,978,443, Cl. 209-684.000.
Commissariat a l'Energie Atomique: *See—*
Lazzari, Jean-Pierre, 4,978,253, Cl. 406-88.000.
Lemercier, Guy; and Renaux, Charley, 4,978,497, Cl. 376-290.000.
Communications Satellite Corporation: *See—*
Gupta, Ramesh K.; and Geller, Bernard D., 4,978,932, Cl. 333-81.00R.
Compuadd, Corporation: *See—*
Murphy, Preston J., 4,979,075, Cl. 361-399.000.
Computer Gesellschaft Konstanz mbH: *See—*
Mittelbach, Helmut; Mueller, Xaver; and Schlegel, Peter, 4,979,227, Cl. 382-40.000.
Cona, John A.: *See—*
Farrell, Kenneth L.; Cona, John A.; Glugla, Ronald; and Bly, Lloyd G., 4,977,838, Cl. 110-173.00R.
Conder, George A.: *See—*
Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., 4,978,670, Cl. 514-345.000.
Conforex AB: *See—*
Eckerud, Ove, 4,977,648, Cl. 24-573.100.
Conger, William W., IV. Vibration dampened blower. 4,978,281, Cl. 417-423.150.
Conner Peripherals, Inc.: *See—*
Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., 4,979,055, Cl. 360-69.000.
Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., 4,979,056, Cl. 360-69.000.
Stefansky, Frederick M.; and Bagnell, Glade N., 4,979,062, Cl. 360-97.020.
Conroy, Michael: *See—*
Colin, Gerard; and Conroy, Michael, 4,978,539, Cl. 426-11.000.
Consolidated Devices Inc.: *See—*
Grabovac, Bosko; and Kurtovic, Zlatko, 4,977,775, Cl. 73-1.00C.
Cook, James E.; and Eriksen, O. Harald S. Double acting simplex plunger pump. 4,978,284, Cl. 417-534.000.
Cookston, H. Stephen: *See—*
Capozzi, Emil E.; and Cookston, H. Stephen, 4,978,336, Cl. 604-82.000.
Cooney, Anthony: *See—*
Bialy, Louis; Cooney, Anthony; Sheridan, William; and Reiskin, Edward, 4,977,982, Cl. 187-89.000.
Cooper Industries, Inc.: *See—*
Ford, Alan A., 4,978,094, Cl. 248-261.000.
Cope, Johanthan C.; Davis, Alan E.; Pitman, William B.; and Row, Kathy M., to Valley Grain Products, Inc. Method and apparatus for continuous producing of tortilla chips. 4,978,548, Cl. 426-439.000.
Copeland, Hugh D.: *See—*
Lapota, David; Mastny, Gary F.; and Copeland, Hugh D., 4,978,854, Cl. 250-361.00C.
Coppens, Wilfred: *See—*
Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, 4,978,586, Cl. 428-625.000.
Corley, Andrew J., III, to Corley Manufacturing Company. Edging apparatus. 4,977,805, Cl. 83-76.800.
Corley Manufacturing Company: *See—*
Corley, Andrew J., III, 4,977,805, Cl. 83-76.800.
Cornell Research Foundation: *See—*
Sachse, Wolfgang H.; and Grabec, D. Igor, 4,979,124, Cl. 364-507.000.
Cornell Research Foundation, Inc.: *See—*
Williams, Evan R.; and McLafferty, Fred W., 4,978,852, Cl. 250-282.000.
Corning Incorporated: *See—*
Bardhan, Pronob; Bartholomew, Roger F.; Trotter, Donald M., Jr.; and Yu, Chyang J., 4,978,646, Cl. 501-134.000.
Cornu, Daniel; Harsigny, Christian; and Thiebaut, Jean, to Essilor International Cie Generale d'Optique. Large diameter positive power ophthalmic lens. 4,978,211, Cl. 351-159.000.
Cornwell, Michael J.: *See—*
Bieniarz, Christopher; Cornwell, Michael J.; and Young, Douglas F., 4,978,613, Cl. 435-18.000.
Costerousse, Germain: *See—*
Teutsch, Jean-Georges; Torelli, Vesperto; Deraedt, Roger; Philibert, Daniel; and Costerousse, Germain, 4,978,657, Cl. 514-175.000.
Coughlin, Robert W.; and Davis, Edward M., to SymBiotech Incorporated. Desensitizing activated carbon sorbents to the effects of humidity. 4,978,650, Cl. 502-432.000.
Courtney Pope Lighting Limitd: *See—*
Leach, Dennis; and Dinmore, Clive, 4,979,081, Cl. 362-219.000.
Courtois, Pierre-Jacques F.; Scheys, Guy F. J.; and Semal, Pierre-Nicholaas W., to U.S. Philips Corporation. Dynamic sensing point CSMA packet switching controller. 4,979,168, Cl. 370-95.100.

Cowart, Brooks, to Echelon Systems Corporation. Transceiver employing direct sequence spread spectrum techniques. 4,979,183, Cl. 375-1.000.

Cowgill, Donald F.: *See*—
Brannon, Paul J.; and Cowgill, Donald F., 4,978,893, Cl. 315-150.000.

Cox, Graham C.: *See*—
Perryman, Michael A. C.; and Cox, Graham C., 4,979,221, Cl. 382-1.000.

Coyle, Catherine L.; Halbert, Thomas R.; and Stiefel, Edward I., to Exxon Research and Engineering Company. Multi-function additive for lubricating oils. 4,978,464, Cl. 252-42.700.

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Crabbe, Edwin P., Jr., to AG Communication Systems Corporation. Task synchronization arrangement and method for remote duplex processors. 4,979,108, Cl. 364-200.000.

Crane, Carl D., III; and Haukoos, Dana S., to University of Florida. Hybrid robotic vehicle. 4,977,971, Cl. 180-8.300.

Cray, Stephen E.; McVie, James; and Yianni, Paul A., to Dow Corning Limited. Treatment of fibrous materials. 4,978,561, Cl. 427-387.000.

Creager, Richard S.: *See*—
Mach, Patrick A.; Thompson, Jeffrey A.; Creager, Richard S.; and Fink, Cheri W., 4,978,632, Cl. 435-7.000.

Cremins, John F.; Kim, Young R.; Malin, Michael J.; and Sclafani, Louis D., to Technicon Instruments Corporation. Reagent for the determination of a differential white blood cell count. 4,978,624, Cl. 436-17.000.

Crisler, Kenneth J.: *See*—
Kotzin, Michael D.; van den Heuvel, Anthony P.; Crisler, Kenneth J.; Hiben, Bradley M.; Mohl, Lawrence M.; and Poulin, Mark R., 4,979,188, Cl. 375-34.000.

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Crowe, Gregory D.: *See*—
Jacobs, Dwight W.; and Crowe, Gregory D., 4,978,007, Cl. 206-469.000.

Crowe, Kenneth M.: *See*—
Tillotson, James A., III; and Crowe, Kenneth M., 4,978,442, Cl. 209-215.000.

Crowe, Lawrence E.: *See*—
Huss, John; Hoppe, Richard J.; Crowe, Lawrence E.; Sutrina, Thomas; and Lakin, Eric D., 4,979,090, Cl. 363-141.000.

Cueman, Michael K.; Thomas, Lewis J., III; Trzaskos, Casmir R.; Matula, August D.; and Austin, Michael J., to General Electric Company. Microfocus X-ray tube with optical spot size sensing means. 4,979,199, Cl. 378-121.000.

Cunningham, John A.: *See*—
Terrill, Richard C.; Allgood, Fred A.; and Cunningham, John A., 4,978,340, Cl. 604-195.000.

Currey, Lesley B.; and Currey, Lesley B. Seat pedestal mount. 4,977,848, Cl. 114-363.000.

Currey, Lesley B.: *See*—
Currey, Lesley B.; and Currey, Lesley B., 4,977,848, Cl. 114-363.000.

Curtin, Keith W.: *See*—
Davis, Richard K.; and Curtin, Keith W., 4,979,122, Cl. 364-483.000.

Custom Molders Inc.: *See*—
Anderson, Franklin R.; and Schroer, John M., 4,978,091, Cl. 248-74.300.

Cutayar, Jacques-Marcel; Poillon, Dominique; and Cutayar, Sylvie, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for the controlled oxygenation of an alcoholic fermentation must or wort. 4,978,545, Cl. 426-312.000.

Cutayar, Sylvie: *See*—
Cutayar, Jacques-Marcel; Poillon, Dominique; and Cutayar, Sylvie, 4,978,545, Cl. 426-312.000.

CVD Incorporated: *See*—
Purohit, Parul V.; Kirsch, Jeffery L.; and MacDonald, James C., 4,978,577, Cl. 428-409.000.

Cypress Semiconductor Corp.: *See*—
Hoff, David; and Pathak, Saroj, 4,978,905, Cl. 323-314.000.

Czich, Erhard: *See*—
Schmidt, Herbert; Czich, Erhard; and Hefner, Horst, 4,977,987, Cl. 188-264.00G.

D.B. Industries, Inc.: *See*—
Casebolt, Scott C., 4,977,647, Cl. 24-599.500.

Da Costa, Caio M. F. N., to Empresa Brasileira de Compressores. Horizontal crankshaft rotary compressor with oil drain tube from muffler to interior of shell. 4,978,287, Cl. 418-96.000.

Da Costa, Caio Mario F. N., to Empresa Brasileira de Compressores S.A. Reed valve for hermetic compressor. 4,978,285, Cl. 417-569.000.

Dahl, Dean R.; and Syring, Paul G. Foldable towing hitch for vehicles. 4,978,134, Cl. 280-491.400.

Dai Nippon Insatsu Kabushiki Kaisha: *See*—
Tsuruoka, Yoshiaki; and Saitou, Norikazu, 4,979,159, Cl. 369-58.000.

Daicel Chemical Industries, Ltd.: *See*—
Kanno, Tatsuya; Takahashi, Ikuo; Sasaki, Kenichi; Iguichi, Yoshihiro; and Fukuda, Yutaka, 4,978,578, Cl. 428-412.000.
Murai, Takaaki; and Fujii, Tatsumi, 4,978,691, Cl. 521-172.000.
Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,978,385, Cl. 71-94.000.

Daido Metal Company Ltd.: *See*—
Mori, Sanae; and Niwa, Kosaburo, 4,977,664, Cl. 29-563.000.
Mori, Sanae; Sakamoto, Masaaki; Wada, Motomu; and Ishikawa, Hideo, 4,978,587, Cl. 428-645.000.

Daiichi Denso Buhin Co., Ltd.: *See*—
Takano, Tsunesuke; and Shinzawa, Kouichi, 4,979,083, Cl. 362-394.000.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Okazaki, Masahide, 4,978,970, Cl. 346-1.100.

Dairyland Automation, Inc.: *See*—
Norwood, Eugene E., 4,977,856, Cl. 119-14.030.

Daiwa Seiko, Inc.: *See*—
Iwama, Shinichi; Tsugami, Keiji; and Yamada, Shigeto, 4,977,692, Cl. 36-119.000.

Dal-Craft, Inc.: *See*—
Dalbo, Emil J.; and Dalbo, Loraine E., 4,978,008, Cl. 206-574.000.

Dalbo, Emil J.; and Dalbo, Loraine E., to Dal-Craft, Inc. Yarn color organizer for needlecraft project. 4,978,008, Cl. 206-574.000.

Dalbo, Loraine E.: *See*—
Dalbo, Emil J.; and Dalbo, Loraine E., 4,978,008, Cl. 206-574.000.

Daley, Peter S.: *See*—
Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., 4,977,839, Cl. 110-346.000.

Dallas Semiconductor Corporation: *See*—
Dias, Donald R., 4,978,869, Cl. 307-443.000.
Lee, Robert D., 4,979,016, Cl. 357-70.000.

Dallmer GmbH & Co., Firma: *See*—
Dallmer, Johannes, 4,978,250, Cl. 405-303.000.

Dallmer, Johannes, to Dallmer GmbH & Co., Firma. Discharge fitting for a tiled floor. 4,978,250, Cl. 405-303.000.

Dalton, Raymond F.; and Leng, John L., to Imperial Chemical Industries PLC. Composition and use of the composition for the extraction of metals from aqueous solution. 4,978,788, Cl. 564-265.000.

Daly, James C.; Nick, Jeffrey M.; and Rodegeb, Franklin J., to International Business Machines. Method and apparatus for automatic recovery from excessive spin loops in an N-way multiprocessing system. 4,979,105, Cl. 364-200.000.

Danieli & C. Officine Meccaniche SpA: *See*—
Poloni, Alfredo, 4,977,806, Cl. 83-105.000.

Daniels, Mark E.: *See*—
MacLean, Malcolm K.; and Daniels, Mark E., 4,978,071, Cl. 239-265.190.

Danzaki, Tsutomu: *See*—
Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,978,898, Cl. 318-280.000.

Danzuka, Toshio: *See*—
Ito, Masumi; Yokota, Hiroshi; Danzuka, Toshio; and Takagi, Masahiro, 4,978,378, Cl. 65-3.120.

Dario, Peter: *See*—
von der Crone, Jost; Overney, Gonzague; and Dario, Peter, 4,978,768, Cl. 558-416.000.

Darley, Henry M., to Texas Instruments Incorporated. Signed digit adder circuit. 4,979,140, Cl. 364-786.000.

Das, Sajal; and Prevorsek, Dusan C., to Allied-Signal. Cyanato group containing phenolic resins, phenolic triazines derived therefrom. 4,978,727, Cl. 525-504.000.

Data General Corporation: *See*—
Almond, Gary R.; and Nobile, Daniel A., 4,979,169, Cl. 370-99.000.
Gelinas, Robert G.; and Radogna, Thomas V., 4,979,141, Cl. 364-787.000.

Dattilo, Donald P. Universal electrolyte level indicator for wet cell batteries. 4,978,592, Cl. 429-89.000.

Daugherty, Paul R.; McNair, Jerry R.; and O'Donnell, Patrick F., to Amoco Corporation. Method for controlling a quench fluid velocity in a polymer melt spinning process. 4,978,485, Cl. 264-40.200.

Daverio AG: *See*—
Maier, Willy; Bachmann, Thomas; Konrad, Martin; and Staub, Markus, 4,978,117, Cl. 271-206.000.

Davies, Gerald G., to Sheridan Catheter Corporation. Laryngo-tracheal analgesia endotracheal tube. 4,977,894, Cl. 128-207.150.

Davis, Alan E.: *See*—
Cope, Johanthan C.; Davis, Alan E.; Pitman, William B.; and Row, Kathy M., 4,978,548, Cl. 426-439.000.

Davis, Albert H., Jr. Drier with blower motor-heated air and flow recirculation. 4,977,690, Cl. 34-243.00R.

Davis, Edward M.: *See*—
Coughlin, Robert W.; and Davis, Edward M., 4,978,650, Cl. 502-432.000.

Davis, James E., to Du Pont de Nemours, E. I., and Company. Capacitive liquid level sensor. 4,977,786, Cl. 73-864.240.

Davis, John W. Lawn sculpturing method and apparatus. 4,977,735, Cl. 56-295.000.

Davis, Richard K.; and Curtin, Keith W., to GE Fanuc Automation North America Inc. Apparatus and method for monitoring power. 4,979,122, Cl. 364-483.000.

Day, Ding-Yuan S.: *See*—
Hua, Chang-Hwang; Chan, Simon S.; Day, Ding-Yuan S.; and Lee, Adrian C., 4,978,639, Cl. 437-230.000.

Dayco Products, Inc.: *See*—
Henderson, Dewey D., 4,978,326, Cl. 474-135.000.

Dean, Barry D.: *See*—
Amone, Michael J.; and Dean, Barry D., 4,978,739, Cl. 528-271.000.

Dean, Robert C., Jr.; Grels, Peter V.; Karkare, Subhash B.; and Runstadler, Peter W., Jr., to Verax Corporation. Fluidized cell cultivation process. 4,978,616, Cl. 435-70.300.

Dean, Terence F., to Thorn EMI plc. Optical image rotators. 4,978,200, Cl. 350-287.000.

Deere & Company: *See*—
Bergene, Mark A.; and Boe, Thomas E., 4,979,092, Cl. 364-148.000.

Defazio, Augustine: *See*—
Kamen, Melvin E.; Bernstein, Philip; and Defazio, Augustine, 4,978,524, Cl. 424-64.000.

Degre, Francois, to Bio Serae Laboratoires S.A. Process for preventing degradation of an anti-bacterial composition. 4,978,528, Cl. 424-94.400.

de Groot, Rob, to R. de Groot Holding Laag-Zuthem B.V. Manipulator. 4,978,274, Cl. 414-744.300.

De Gryse, Roger: *See*—
Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, 4,978,586, Cl. 428-625.000.

Degtyareva, Eleonora V.: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Deguire, Pierre: *See*—
Legault, Claude; and Deguire, Pierre, 4,977,765, Cl. 70-268.000.

DeLange, Robert J.: *See*—
Merrison, John C.; DeLange, Robert J.; and Rowan, Timothy M., 4,978,897, Cl. 318-268.000.

Del Fava, Donald: *See*—
Allen, Dennis; Del Fava, Donald; Geesey, Harold D.; Koht, Lowell I.; McClintic, Mark S.; Newton, Dean A.; and Petro, Timothy L., Sr., 4,978,194, Cl. 350-96.230.

Delta Aero Flow Inc.: *See*—
Von Widmann, George; and Parenti, Robert V., 4,977,977, Cl. 181-235.000.

Delta Clutch, Inc.: *See*—
Mahoney, Pual E., 4,977,991, Cl. 192-70.190.

DeMarco, Vincent J. User wearable inflatable garment. 4,977,623, Cl. 2-69.000.

DeMarinis, Robert M.: *See*—
Lafferty, John J.; DeMarinis, Robert M.; and Venslavsky, Joseph W., 4,978,660, Cl. 514-215.000.

DeMartino, Ronald N.: *See*—
Allen, Diane E.; and DeMartino, Ronald N., 4,978,476, Cl. 252-299.010.

Demers, Rodney C. Magnetic window cleaning apparatus. 4,977,637, Cl. 15-104.00R.

Denick, John, Jr. Easily dispersible psyllium compositions. 4,978,529, Cl. 424-195.100.

Denis, Jean-Pierre. Firearms ammunition, particularly game-shooting ammunition. 4,977,834, Cl. 102-439.000.

Denne, Phillip R. M., to Super X Limited. Simulator mechanism. 4,978,299, Cl. 434-58.000.

Dennis, Wayne V. Locking device for a video cassette recorder and/or player. 4,977,762, Cl. 70-14.000.

Denny, Patrick J.: *See*—
Carnell, Peter J. H.; and Denny, Patrick J., 4,978,439, Cl. 208-91.000.

Dent, Wu-Tsung: *See*—
Fu, Shih-Lien; and Dent, Wu-Tsung, 4,978,282, Cl. 417-360.000.

Dentsply Management Corp.: *See*—
Jones, Leslie A., 4,978,391, Cl. 106-35.000.

Denzinger, Walter: *See*—
Pfohl, Sigberg; Kroener, Michael; Hartmann, Heinrich; and Denzinger, Walter, 4,978,427, Cl. 162-168.200.

Depuy, Garth D.; and Farrell, Eugene A., to Carthage Machine Company. Knife assembly for chipper. 4,977,939, Cl. 144-176.000.

Deraedt, Roger: *See*—
Teutsch, Jean-Georges; Torelli, Vesperto; Deraedt, Roger; Philibert, Daniel; and Costerousse, Germain, 4,978,657, Cl. 514-175.000.

De Ruiter, Ernest: *See*—
Von Blucher, Hubert; Von Blucher, Hasso; and De Ruiter, Ernest, 4,978,460, Cl. 252-2.000.

DeRuiter, J. W.; and Butot, Lucas A., to Super M Associates. High frequency oven with plural heating levels and an improved efficiency of power transfer. 4,978,826, Cl. 219-10.810.

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Deutsche Forschungsanstalt fur Luft-und Raumfahrt eV: *See*—
Lohoefer, Georg, 4,979,182, Cl. 373-138.000.

Deutsche Gesellschaft fur Wiederaufarbeitung Von Kernbrennstoffen mbH: *See*—
Wichert, Bernhard; and Peine, Klaus-Dieter, 4,978,090, Cl. 248-74.100.

Deutsche Voest-Alpine Industrienalagenbau GmbH: *See*—
Kepplinger, Werner, 4,978,387, Cl. 75-445.000.

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Devienne, Paul: *See*—
Alquier, Bruno; Belou, Olivier; Devienne, Paul; and Martin, Thierry, 4,978,089, Cl. 244-129.500.

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DiCicco, Darrell S.: *See*—
Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., 4,979,203, Cl. 378-206.000.

Dickenson, John B.: *See*—
Nichols, James D.; and Dickenson, John B., 4,978,728, Cl. 525-528.000.

Didier-Werke AG: *See*—
Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, 4,978,108, Cl. 266-220.000.

Diedrich, Heinz K. Vacuum container for cryogenically cooled electron device packaging. 4,977,748, Cl. 62-51.100.

Diehl GmbH & Co.: *See*—
Himmert, Rainer; Brand, Heinrich; Dommer, Josef; and Bock, Erich, 4,978,088, Cl. 244-3.240.

Diesel Kiki Co., Ltd.: *See*—
Nakamura, Hisashi; Kubo, Ken-ichi; and Hirakawa, Toshiro, 4,977,882, Cl. 123-502.000.
Ohtsuka, Masuhiro; Satoh, Yuji; and Kono, Hiromi, 4,977,992, Cl. 192-0.073.

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Digital Electronics Automation, Inc.: *See*—
Maiocco, Roberto; and Basadonna, Luciano, 4,979,224, Cl. 382-8.000.

Digital Equipment Corporation: *See*—
Sager, David J.; Hesch, Leon D.; Ingraham, Andrew D.; and Samaras, William A., 4,979,190, Cl. 375-106.000.
Triolo, Victoria M.; Bloom, Elbert; and Hartwell, David W., 4,979,097, Cl. 364-200.000.

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Dinmore, Clive: *See*—
Leach, Dennis; and Dinmore, Clive, 4,979,081, Cl. 362-219.000.

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Ferrando, William A.; Divecha, Amarnath P.; and Karmarkar, Subhash D., 4,978,054, Cl. 228-194.000.

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Dodt, Jurgen: *See*—
Sprenger, Gerhard; and Dodt, Jurgen, 4,978,248, Cl. 405-292.000.

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Campo, Philippe; Cocolios, Panayotis; Dognin, Paul; and Ledon, Henry, 4,978,802, Cl. 568-432.000.

Dohler, Hardi; Jachmann, Jurgen; Weitemeyer, Christian; and Wewers, Dietmar, to Th. Goldschmidt AG. Polysiloxanes with (meth)acrylate ester groups linked over SiC groups and their use as radiation-curable coating materials for sheet-like carriers. 4,978,726, Cl. 525-479.000.

Dole Associates, Inc.: *See*—
Dole, Charles M.; Webster, Gary L.; and Smith, Ward C., 4,978,502, Cl. 422-58.000.

Dole, Charles M.; Webster, Gary L.; and Smith, Ward C., to Dole Associates, Inc. Immunoassay or diagnostic device and method of manufacture. 4,978,502, Cl. 422-58.000.

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Dommer, Josef: *See*—
Himmert, Rainer; Brand, Heinrich; Dommer, Josef; and Bock, Erich, 4,978,088, Cl. 244-3.240.

Donnelly, Donald E.; Zikes, Bradley C.; Moore, Dwain F.; Price, Jeffrey E.; and Toth, Bartholomew L., to Emerson Electric Co. Fuel

burner control system with hot surface ignition. 4,978,292, Cl. 431-75.000.

Dorman, Isidore, to NB Jackets de Puerto Rico. Multi-channel transparent jacket for microfilm strips having notched dummy strip. 4,977,694, Cl. 40-159.000.

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Doukas, Peter H.: *See*—
Nelson, Mark L.; Doukas, Peter H.; Salganicoff, Leon; and Ricciardi, Fiore J., 4,978,662, Cl. 514-235.800.

Dow Chemical Company, The: *See*—
Ainsworth, Oliver C.; and Glomski, Ronald L., 4,978,703, Cl. 524-298.000.
Flynn, James H.; Ainsworth, Oliver C.; and Blanchard, Robert R., 4,978,716, Cl. 525-195.000.
Hallworth, Gerald, 4,978,402, Cl. 156-77.000.
Koster, Robert A.; Brondsema, Philip J.; Pennington, Willis J.; Sumner, William C.; and Vilmer, Susan E., 4,978,811, Cl. 568-734.000.
Lyons, John W.; Roper, John A., III; and Aldrich, Peter D., 4,978,863, Cl. 250-574.000.
McCullough, Francis P., Jr., 4,977,654, Cl. 28-278.000.
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,978,571, Cl. 428-263.000.
Mendoza, Abel, 4,978,809, Cl. 568-720.000.

Dow Corning Corporation: *See*—
Clark, Joseph N.; Coble, David G.; and Kroupa, Loretta N., 4,978,696, Cl. 523-212.000.
Dietlein, John E.; Kamis, Russell P.; and Klosowski, Jerome M., 4,978,706, Cl. 524-423.000.
Lamont, Peter, 4,978,705, Cl. 524-417.000.
Liles, Donald T., 4,978,710, Cl. 524-837.000.
Starch, Michael S., 4,978,471, Cl. 252-174.150.
Vincent, Gary A.; and Meyer, Daniel F., 4,978,694, Cl. 523-173.000.

Dow Corning Limited: *See*—
Cray, Stephen E.; McVie, James; and Yianni, Paul A., 4,978,561, Cl. 427-387.000.
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Drake, Curtis L.; Przywarty, Francis L.; and Ammon, Robert L., to Westinghouse Electric Corp. Method of ARC spraying. 4,978,557, Cl. 427-37.000.

Dravida, Subrahmanyam: *See*—
Cheng, Ying; and Dravida, Subrahmanyam, 4,979,174, Cl. 371-41.000.

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Drori, Mordeki. Filtering element. 4,978,450, Cl. 210-488.000.

Druzhinin, Lel K.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Du Pont Canada Inc.: *See*—
Buchanan, Douglas R., 4,977,739, Cl. 57-293.000.
Kelly, Peter Y., 4,978,436, Cl. 204-165.000.

Dualite, Inc.: *See*—
Seggerson, Patrick J., 4,977,698, Cl. 40-618.000.

Dubrac, Claude: *See*—
Blosseville, Patrick; and Dubrac, Claude, 4,977,721, Cl. 52-410.000.

Dubrulle, Gerard; and Roullet, Alain, to l'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Plant for packing products in containers. 4,977,723, Cl. 53-110.000.

Duce, Edward, to Stockrail Limited. Warehousing systems. 4,977,996, Cl. 198-349.950.

Ducret, Lucien C. Saw for cutting large diameter shielded conduit. 4,977,671, Cl. 30-90.200.

Dugger, Harry A., to Pharmaconsult, Inc. Liquid nifidipine composition. 4,978,533, Cl. 424-456.000.

Dulgier, Rostislav O.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Dumas, Daniel; and Hoynant, George, to Societe des Electrodes & Refractaires Savoie. Arrangement to prevent the molten core of a nuclear reactor from penetrating into the ground. 4,978,496, Cl. 376-280.000.

Dunbar, James J.: *See*—
Sun, Jim C.; Boone, Mark B.; Dunbar, James J.; and Weedon, Gene C., 4,978,492, Cl. 264-180.000.

Duncan, Gerald; Shacklock, Frank W.; and Greenman, Murray, to Fisher & Paykel Limited. Flow control systems and/or laundry machines including such flow control systems. 4,978,058, Cl. 236-12.120.

Dunlop Limited a British Company: *See*—
Wells, Trevor C.; and Waring, Anthony J., 4,977,985, Cl. 188-71.100.

Dunton, David P., to Colgate-Palmolive Co. Flexible pouch with folded spout. 4,978,232, Cl. 383-33.000.

Du Pont de Nemours, E. I., and Company: *See*—
Davis, James E., 4,977,786, Cl. 73-864.240.
Falcoff, Allan F.; Fountain, Frank S.; and Pusey, Donald K., 4,977,853, Cl. 118-665.000.
Hertler, Walter R., 4,978,723, Cl. 525-326.500.

Dupont, Philippe: *See*—
Brehm, Claude; Ramos, Josiane; and Dupont, Philippe, 4,978,377, Cl. 65-3.110.

Durkee, William D., Jr.; and Muller, Philip J., to General Electric Company. Interlock system. 4,977,935, Cl. 141-99.000.

Durnwirth, Roy K., Jr.; George, John E.; and Morton, Kim L., to AT&T Bell Laboratories. Selective solder formation on printed circuit boards. 4,978,423, Cl. 156-659.100.

Duttweiler, Donald L.: *See*—
Chamzas, Christodoulos; and Duttweiler, Donald L., 4,979,049, Cl. 358-426.000.

Dykstra, Richard A., to Briggs & Stratton Corporation. Speed limiter for internal combustion engines. 4,977,877, Cl. 123-335.000.

Dynabook Technologies Corporation: *See*—
Herron, Matthew A.; and Boyle, Dennis J., 4,978,949, Cl. 340-711.000.

Dynamics Research Corporation: *See*—
Volpe, Luke R., Jr.; and Thomas, Lowell E., 4,978,972, Cl. 346-76.0PH.

Dynetics Engineering Corporation: *See*—
Hill, James E., 4,978,845, Cl. 250-222.100.

Dysarz, Edward D.; and Van Gilder, Derek R. Trap in barrel one handed retractable safety syringe. 4,978,343, Cl. 604-195.000.

E.C.H. Will GmbH: *See*—
Besemann, Alfred, 4,977,788, Cl. 74-424.80R.

E. J. Brooks Co.: *See*—
Gnoinski, Richard, 4,978,026, Cl. 220-214.000.

E. R. Squibb & Sons, Inc.: *See*—
Kronenthal, David, 4,978,762, Cl. 549-463.000.

Eastman Kodak Company: *See*—
Alessi, Paula J.; Giorgianni, Edward J.; and Madden, Thomas E., 4,979,032, Cl. 358-76.000.
Ellsworth, Roger D.; Richards, William A.; Samuels, James T.; and Bober, James K., 4,978,858, Cl. 250-560.000.
Harris, Clark E.; and Shaw, Joel R., 4,978,084, Cl. 242-74.000.
Keep, Gerald T., 4,978,569, Cl. 428-209.000.
Lioy, Daniel C.; Hurtubis, Edward F.; and Schickler, Edward R., 4,977,656, Cl. 29-121.800.
Menon, Krishna S.; and Beck, Rodger W., 4,978,550, Cl. 426-549.000.
Simons, Michael J., 4,978,652, Cl. 503-227.000.
Smart, David C.; Cloutier, Robert P.; Pagano, Daniel M.; and Kirk, Duane B., 4,978,985, Cl. 354-275.000.
Tsoi, Siu C., 4,978,605, Cl. 430-557.000.
Vogel, Richard M., 4,979,042, Cl. 358-163.000.
White, Alan W., 4,978,682, Cl. 514-616.000.

Eaton Corporation: *See*—
Hicks, Bradford W., 4,977,972, Cl. 180-24.040.
McWilliams, Dennis M., 4,977,922, Cl. 137-269.000.
Stahly, Daniel C., 4,978,060, Cl. 236-34.500.

Eberle, Louis C.: *See*—
Luchetta, Joseph F.; and Eberle, Louis C., 4,978,331, Cl. 494-37.000.

Echelon Systems Corporation: *See*—
Cowart, Brooks, 4,979,183, Cl. 375-1.000.

Eckels, Phillip W.: *See*—
Mallick, George T., Jr.; Logan, James R.; and Eckels, Phillip W., 4,978,922, Cl. 324-652.000.

Eckerle, Joseph S., to SRI International. Axle spindle load and torque sensing apparatus and method for sensing load and torque. 4,977,784, Cl. 73-862.540.

Eckerud, Ove, to Conforex AB. Device at a snap-in lock. 4,977,648, Cl. 24-573.100.

Eckler, Paul E., to Questra Chemicals Corp. Method for preparing essentially haze-free isophthalic acid- and polymethylolalkanoic acid-containing resins. 4,978,741, Cl. 528-279.000.

Ecolab Inc.: *See*—
Seaman, Charles E., Jr., 4,978,469, Cl. 252-170.000.

Edahiro, Takeshi; Kanai, Seita; and Ushio, Kouichi, to Mazda Motor Corporation. Rear suspension system for four-wheel-steered vehicle. 4,978,131, Cl. 280-91.000.

Edahiro, Takeshi; Kumada, Hiroyoshi; Morita, Toshiki; Takehara, Shin; and Shibata, Mineharu, to Mazda Motor Corporation. Vehicle suspension system. 4,978,135, Cl. 280-707.000.

Edgley, Richard R.; Gierut, Frederick J.; and Lenz, William, to Molex Incorporated. Multiple-conductor electrical connector and stamped and formed contacts for use therewith. 4,978,315, Cl. 439-441.000.

Edleman, David G.: *See*—
Thorne, Rexford M.; and Edleman, David G., 4,978,133, Cl. 280-484.000.

Educational Testing Service: *See*—
Kraft, William D., 4,978,305, Cl. 434-353.000

Edward Orton Jr., Ceramic Foundation: *See*—
Vukovich, Milan, Jr., 4,978,295, Cl. 432-120.000.

Edward S. Robbins, III: *See*—
Haygood, David L., 4,978,700, Cl. 524-156.000.

Edwards, Allen P.: *See*—
Carp, Stuart L.; and Edwards, Allen P., 4,978,931, Cl. 333-28.00R.

Edwards, Keith R., to Abex Corporation. Bonding friction material to plated substrates. 4,977,986, Cl. 188-73.100.

Effland, Richard C.; and Fink, David M., to Hoechst-Roussel Pharmaceuticals Inc. 5-(1-aminocyclohexyl)-2(1H)-pyridinone compounds which have pharmaceutical utility. 4,978,663, Cl. 514-231.800.

Eggebeen, James A. Bimodal multi-track magnetic head. 4,979,051, Cl. 360-21.000.

Eggleston, Dean E., to Central Plastics Company. Method and apparatus for electrically heat welding thermoplastic fittings. 4,978,837, Cl. 219-497.000.

Eglinton, Robert B.: *See*—
Roberson, Glenn A., Jr.; and Eglinton, Robert B., 4,977,688, Cl. 34-92.000.

Eguchi, Shusaku: *See*—
Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, 4,978,472, Cl. 252-301.40H.

Eguchi, Yoshio: *See*—
Takagawa, Ryozo; Tanabe, Hisaki; Asakura, Koji; Yamada, Mitsuo; Ohsugi, Hiroharu; Mizuguchi, Ryuzo; and Eguchi, Yoshio, 4,978,777, Cl. 560-224.000.

Ehret, Charles O.: *See*—
Taylor, Harry L.; and Ehret, Charles O., 4,977,818, Cl. 98-31.600.

Eiffler, Elmer E.; Iyer, Natraj C.; Male, Alan T.; and Boes, David J., to Westinghouse Electric Corp. Method of treating a coating on a reactor coolant pump sealing surface. 4,978,487, Cl. 264-60.000.

Eisai Co., Ltd.: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Eka Nobel AB: *See*—
Norell, Maria; and Svedin, Bjorn H., 4,978,517, Cl. 423-479.000.

Ekstrom, Michael P.; and Havira, R. Mark. Method and apparatus for investigating stand-off in a borehole. 4,979,151, Cl. 367-35.000.

Eldridge, Stanley W. Exhaust heated spreader. 4,978,068, Cl. 239-129.000.

Electro Chemical Engineering GmbH: *See*—
Schmeling, Edith L.; Roschenbleck, Benno; and Weidemann, Michael H., 4,978,432, Cl. 204-58.400.

ELF France: *See*—
Fayard, Jean-Claude, 4,977,869, Cl. 123-188.00S.

El Hage, Sami G. Apparatus for determining the contour of the cornea of a human eye. 4,978,213, Cl. 351-212.000.

Eliasz, Michael R. Dental molding process. 4,978,298, Cl. 433-213.000.

Ellestad, George A.; and McGahren, William J., to American Cyanamid Company. Intermediate and process for producing the antibacterial and antitumor agents LL-E33288e-I and LL-E33288Epsilon-Br. 4,978,748, Cl. 536-17.500.

Elliott, Glen R.: *See*—
Barchas, Jack D.; Elliott, Glen R.; Adriaenssens, Peter I.; Bitner, Robert S.; Bowersox, Stephen S.; and Nadasdi, Laszlo, 4,978,669, Cl. 514-292.000.

Ellsworth, Roger D.; Richards, William A.; Samuels, James T.; and Bober, James K., to Eastman Kodak Company. Optical web detection and measurement system especially adapted for controlling replenishment of x-ray film processing chemicals. 4,978,858, Cl. 250-560.000.

Ellwood, Henry, to Farrell Limited. Apparatus for use in producing pellets. 4,978,288, Cl. 425-311.000.

Elmasry, Mohamed A.; and Kidnie, Kevin M., to Minnesota Mining and Manufacturing Company. Process for producing a liquid electrophotographic toner. 4,978,598, Cl. 430-137.000.

Elmer Simpson & Edgar Powell: *See*—
Simpson, Elmer, 4,979,069, Cl. 361-31.000.

Elmore, Clifford L.: *See*—
Cherry, Mark A.; and Elmore, Clifford L., 4,977,873, Cl. 123-267.000.

El-Rashidy, Tahany, to Pharmedic Co. Dosage form for administration of dehydroepiandrosterone. 4,978,532, Cl. 424-448.000.

Elsag International B.V.: *See*—
Beller, Jeffrey A.; Johnson, Ralph K.; Kammerer, Roger; Kaya, Azmi; and Keyes, Marion A., IV, 4,978,425, Cl. 162-49.000.

Eltech Systems Corporation: *See*—
Brannan, James R.; Bean, Andrew S.; Vaccaro, Anthony J.; and Stewart, James J., 4,978,431, Cl. 204-28.000.

Ely, Gary W., to Coe Manufacturing Company, The. Control system for automatic adjustment of lathe knife pitch. 4,979,120, Cl. 364-474.090.

Embry, Donald, to 775 Corporation. Pick-resistant axial split-pin tumbler lock. 4,977,768, Cl. 70-491.000.

Emerson Electric Co.: *See*—
Crow, William D.; and Williams, Ronald D., 4,978,819, Cl. 200-80.00R.
Donnelly, Donald E.; Zikes, Bradley C.; Moore, Dwain F.; Price, Jeffrey E.; and Toth, Bartholomew L., 4,978,292, Cl. 431-75.000.
Quirijnen, A. J. J., 4,978,877, Cl. 310-239.000.

Emhart Industries, Inc.: *See*—
Nebelung, Hermann H.; and Zsifkovits, Johann, 4,978,380, Cl. 65-260.000.

Emmanel Corp.: *See*—
Freed, Herbert D., 4,978,319, Cl. 439-638.000.

Empresa Brasileira de Compressores: *See*—
Da Costa, Caio M. F. N., 4,978,287, Cl. 418-96.000.

Empresa Brasileira de Compressores S.A.: *See*—
Da Costa, Caio Mario F. N., 4,978,285, Cl. 417-569.000.

Endacott, John A. Fluid separation apparatus. 4,978,373, Cl. 55-165.000.

Endo, Satoru: *See*—
Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, 4,978,886, Cl. 313-414.000.

Engel, Walter; Moser, Franz; and Sigrist, Hugo, to Werzeugmaschinenfabrik Oerlikon-Buhrle AG. Method of producing a fragmentation jacket. 4,977,657, Cl. 29-1.210.

Engle, Thomas H., to General Signal Corporation. Automatic self-resetting parking brake. 4,978,178, Cl. 303-13.000.

Enichem Anic S.p.A.: *See*—
Messina, Giuseppe; Sechi, Giovanni; Lorenzoni, Loreno; and Bruzzi, Vittorio, 4,978,786, Cl. 564-160.000.

Enomoto, Hiroshi: *See*—
Yamada, Koichi; Enomoto, Hiroshi; and Yoshida, Osamu, 4,977,737, Cl. 57-97.000.

Erana, Agustin A. Core blowing machine. 4,977,944, Cl. 164-186.000.

Erdosi, Gyorgy; Balint, Laszlo ; and Osvath, Peter, to Top-Coop Idegenforgalmi es Vendeglatoipari Kisszovetkezet. Method for processing rough timber. 4,977,686, Cl. 34-9.500.

Eremin, Oleg G.: *See*—
Matros, Jury S.; Zagoruiko, Andrei N.; Malakhova, Irina V.; and Eremin, Oleg G., 4,978,519, Cl. 423-574.00R.

Erichsen, Volker Y., to Stober & Morlock, Warmekraft Gesellschaft mbH. Flap lever system for rotary flaps. 4,977,791, Cl. 74-470.000.

Ericson, Thomas H. Book indexing system. 4,978,143, Cl. 283-38.000.

Eriksen, O. Harald S.: *See*—
Cook, James E.; and Eriksen, O. Harald S., 4,978,284, Cl. 417-534.000.

Erving, Richard H.; Ford, William A.; and Miller, Robert R., II, to AT&T Bell Laboratories. Echo suppression arrangement for an adaptive speakerphone. 4,979,163, Cl. 370-32.100.

Esposito, Anthony S.: *See*—
Bayan, Ghawamedin; and Esposito, Anthony S., 4,978,714, Cl. 525-69.000.

Esquivel, Agerico L.; Mitchell, Allan T.; and Tigelaar, Howard L., to Texas Instruments Incorporated. Floating gate memory cell and device. 4,979,004, Cl. 357-23.500.

Essilor International Cie Generale d'Optique: *See*—
Cornu, Daniel; Harsigny, Christian; and Thiebaut, Jean, 4,978,211, Cl. 351-159.000.

Estakhri, Petro: *See*—
Geldman, John S.; and Estakhri, Petro, 4,979,173, Cl. 371-39.100.

Etat Francais represente par le Ministere des Postes, des Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications), Organized under the Law of the French Republic: *See*—
Guichard, Jacques; and Eude, Geard, 4,979,038, Cl. 358-133.000.

Ethyl Corporation: *See*—
Lesher, Kenneth C.; and Henry, Herbert W., 4,978,518, Cl. 423-504.000.

Etzel, Mark R., to Polaroid Corporation. Image recorder with linear laser diode array. 4,978,974, Cl. 346-107.00R.

Eude, Geard: *See*—
Guichard, Jacques; and Eude, Geard, 4,979,038, Cl. 358-133.000.

Evans, Andrew L.; and Behr, Paul A. Fish holder. 4,977,644, Cl. 452-195.000.

Evans, Geoffrey H.: *See*—
Diprose, Michael F.; and Evans, Geoffrey H., 4,978,501, Cl. 422-22.000.

Evva-Werk Spezialerzeugung Von Zylinder- und Sicherheitsschlossern Gesellschaft m.b.H. & Co. Kommanditgesellschaft: *See*—
Prunbauer, Kurt, 4,977,767, Cl. 70-406.000.

Ewall, Ralph X., to B. F. Goodrich Company, The. Wound dressing with hydrophilic absorbent layer. 4,977,892, Cl. 128-156.000.

Ewert, Charles F.; and Grooms, Joseph D. Sail tensioning apparatus. 4,977,843, Cl. 114-109.000.

Extrel Corporation: *See*—
Willoughby, Ross C.; and Buchner, James D., 4,977,785, Cl. 73-863.120.

Exxon Chemical Patents, Inc.: *See*—
Brownawell, Darrell W.; Norris, Donald J.; and Shaub, Harold, 4,977,871, Cl. 123-196.00A.
Hazelton, Donald R.; and Puydak, Robert C., 4,978,717, Cl. 525-195.000.
Heyn, Hans E.; and Narramore, Russell H., 4,978,570, Cl. 428-231.000.

Exxon Research and Engineering Company: *See*—
Bock, Jan; Canevari, Gerard P.; and Robbins, Max L., 4,978,459, Cl. 210-749.000.
Coyle, Catherine L.; Halbert, Thomas R.; and Stiefel, Edward I., 4,978,464, Cl. 252-42.700.
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,978,720, Cl. 525-288.000.
Peiffer, Dennis G.; Lundberg, Robert D.; Newlove, John C.; and Werlein, Eugen R., 4,978,461, Cl. 252-8.511.
Sweet, James R., 4,978,454, Cl. 210-640.000.

Eyers, H. I.: *See*—
Nordholm, Ken; and Eyers, H. I., 4,978,946, Cl. 340-573.000.

Ezawa, Hiroshi; Nakakura, Toshiyuki; Watanabe, Takayuki; and Tsushima, Hiroaki, to Mitsui Toatsu Chemicals, Inc. Polyimide foam. 4,978,692, Cl. 521-185.000.

Fabbri, Vladimiro, to I.E.M.C.A. SpA Industria Elettromeccanica Complessi Automatici. Multiple-channel guiding device for bar-loaders of automatic machine tools. 4,977,801, Cl. 82-127.000.

Fabbrica d'Armi P. Beretta S.p.A.: *See*—
Beretta, Pier G., 4,977,814, Cl. 89-1.400.

Fadner, Thomas A., to Rockwell International Corporation. Hydrophobic and oleophilic microporous inking rollers. 4,977,830, Cl. 101-350.000.

Fainstein, Victor: *See*—
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Fairman, Bruce A.: *See*—
McCullough, Robert B.; Taylor, Robert G., Jr.; Stark, Glenn M.; Swinton, William G.; and Fairman, Bruce A., 4,979,054, Cl. 360-48.000.

Falcoff, Allan F.; Fountain, Frank S.; and Pusey, Donald K., to Du Pont de Nemours, E. I., and Company. Non-contact wet or dry film thickness measuring device. 4,977,853, Cl. 118-665.000.

Faller, Robert V.: *See*—
Barbera, Melvin A.; Agricola, Francis O.; Faller, Robert V.; and Bowman, Worth D., 4,978,522, Cl. 424-52.000.

Fanuc Ltd.: *See*—
Seki, Masaki; and Tatsumi, Haruhiko, 4,979,128, Cl. 364-513.000.

Fanuc Ltd: *See*—
Mizuno, Toru; Hara, Ryuichi; and Nishi, Hiroji, 4,979,127, Cl. 364-513.000.

Farber, Bruce; Kunsemiller, John; and Barradas, Scott, to United States of America, Navy. Seawater hydraulic rotary impact tool. 4,977,966, Cl. 173-159.000.

Farler, Charles W. Dart flight rotation shaft and flight rotation shaft assembly. 4,978,130, Cl. 273-423.000.

Farrell, Eugene A.: *See*—
Depuy, Garth D.; and Farrell, Eugene A., 4,977,939, Cl. 144-176.000.

Farrell, Kenneth L.; Cona, John A.; Glugla, Ronald; and Bly, Lloyd G., to M. H. Detrick Co. Modular door jamb and lintel system for industrial furnaces. 4,977,838, Cl. 110-173.00R.

Farrell Limited: *See*—
Ellwood, Henry, 4,978,288, Cl. 425-311.000.

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Fato, Massimo: *See*—
Bonfiglioli, Silverio; and Fato, Massimo, 4,977,880, Cl. 123-488.000.

Fayard, Jean-Claude, to ELF France. Valve assembly for internal-combustion engines. 4,977,869, Cl. 123-188.00S.

Featherstone, John L.: *See*—
Gallup, Darrell L.; and Featherstone, John L., 4,978,457, Cl. 210-747.000.

Fedorov, Svyatoslav N.; Bagrov, Sergei N.; Trofimov, Vladislav T.; Amstislavskaya, Tatyana S.; and Osipov, Alexei V. Process for producing collagen-based cross-linked biopolymer, an implant from said biopolymer, method for producing said implant, and method for hermetization of corneal or scleral wounds involved in eye injuries, using said implant. 4,978,352, Cl. 606-166.000.

Fehling, Guido; and Stoffel, Gunter. Microsurgical forceps with cleaning fluid passage. 4,977,900, Cl. 128-751.000.

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Ferber, Hubert P.: *See*—
Binder, Dieter; Rovenszky, Franz; and Ferber, Hubert P., 4,978,671, Cl. 514-366.000.

Ferguson, Arthur R. Baffled air intake system for outboard motors. 4,978,321, Cl. 440-88.000.

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Fiedler, Paul; Buding, Hartmuth; and Braden, Rudolf, to Bayer Aktiengesellschaft. Process for the selective hydrogenation of unsatuated compounds. 4,978,771, Cl. 558-459.000.

Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., to Vanderbilt University. Organic disulfide compound useful as antiradiation agents. 4,978,782, Cl. 562-125.000.

Fiermans, Lucien: *See*—
Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, 4,978,586, Cl. 428-625.000.

Fiers, Thomas A.: *See*—
Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., 4,979,055, Cl. 360-69.000.
Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., 4,979,056, Cl. 360-69.000.

Fikentscher, Rolf; Greif, Norbert; Oppenlaender, Knut; and Stork, Karl, to BASF Aktiengesellschaft. Preparation of ether sulfonates and polyglycol ether sulfonates, and products prepared by this method. 4,978,780, Cl. 562-42.000.

Fillman, Harold T.: *See*—
Johnson, Nancy C.; Gill, Robert C.; Leahy, John F.; Gotzmer, Carl, Jr.; Fillman, Harold T.; and , 4,978,482, Cl. 264-3.100.

Fink, Cheri W.: *See*—
Mach, Patrick A.; Thompson, Jeffrey A.; Creager, Richard S.; and Fink, Cheri W., 4,978,632, Cl. 435-7.000.

Fink, David M.: *See*—
Effland, Richard C.; and Fink, David M., 4,978,663, Cl. 514-231.800.

Finnegan, Michael C., to BS&B Safety Systems, Inc. Rupturable fluid flow indicator. 4,978,947, Cl. 340-611.000.

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Finzel, Lothar, to Siemens Aktiengesellschaft. Receptacle for at least one light waveguide connector. 4,978,192, Cl. 350-96.210.

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Fisher, Charles P.; and Pahud, George M. Hand sander. 4,977,712, Cl. 51-380.000.

Fisher & Paykel Limited: *See*—
Duncan, Gerald; Shacklock, Frank W.; and Greenman, Murray, 4,978,058, Cl. 236-12.120.

Fister, Julius C.; Cherukuri, Satyam C.; Mahulikar, Deepak; and O'Donnelly, Brian E., to Olin Corporation. Semiconductor die attach system. 4,978,052, Cl. 228-123.000.

Fitzpatrick, Mark E.; and Gouldsberry, Gary R., to Gazelle Microcircuits, Inc. Circuit for generating reference voltage and reference current. 4,978,904, Cl. 323-313.000.

Flavors Technology: *See*—
Morley, Richard E.; and Baker, David A., 4,979,074, Cl. 361-386.000.

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Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

Flexi-Coil Limited: *See*—
Friggstad, Terrance; and Hundeby, David R., 4,977,964, Cl. 172-310.000.

Flint, Janette E.: *See*—
Ardeshir, Feroza; Flint, Janette E.; and Reese, Robert T., 4,978,621, Cl. 435-243.000.

Fluoroware, Inc.: *See*—
Chinnock, Robert T.; and McKenzie, Jeffrey J., 4,977,929, Cl. 137-863.000.

Flynn, James H.; Ainsworth, Oliver C.; and Blanchard, Robert R., to Dow Chemical Company, The. Thermoplastic elastomers based upon chlorinated polyethylene and a crystalline olefin polymer. 4,978,716, Cl. 525-195.000.

FMC Corporation: *See*—
Leon, Michael A., 4,978,272, Cl. 414-529.000.

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Herbert, Edward; and Cebry, Stephen E., 4,978,906, Cl. 323-361.000.

Foa, Marco: *See*—
Chapoy, L. Lawrence; Coassolo, Alfredo; and Foa, Marco, 4,978,735, Cl. 528-193.000.

Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., to Chemical Waste Management, Inc. Process and apparatus for separating organic contaminants from contaminated inert materials. 4,977,839, Cl. 110-346.000.

Fodali, Adolph, to S & G Tool Aid Corp. Tip attachment for circuit probe tester. 4,978,312, Cl. 439-219.000.

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Folz, Sylvester D.: *See*—
Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., 4,978,670, Cl. 514-345.000.

Fontanes, Sylvain; Birot, Patrice; Marguinaud, Andre ; Quignon, Thierry; and Romann, Brigitte, to Societe Anonyme dite : Alcatel Espace. Method of digitally evaluating the frequency and the phase of signals, and a device for implementing such a method. 4,979,215, Cl. 381-49.000.

Foran, Michael: *See*—
Leake, Craig; Foran, Michael; and Atkinson, Jeffrey G., 4,978,411, Cl. 156-336.000.

Ford, Alan A., to Cooper Industries, Inc. Bracket for curtain rods. 4,978,094, Cl. 248-261.000.

Ford Motor Company: *See*—
Pierce, Stanley L., 4,978,328, Cl. 475-66.000.
Walker, Noel A., 4,978,958, Cl. 341-159.000.
Zerod, Richard D.; and Hamel, Gregory R., 4,978,926, Cl. 330-279.000.

Ford New Holland, Inc.: *See*—
Radke, Daniel D.; Pabodie, Robert M., Jr.; and Ball, Garry L., 4,978,273, Cl. 414-697.000.

Ford W. Hall Company: *See*—
Hall, Ford W., 4,978,447, Cl. 210-241.000.

Ford, William A.: *See*—
Erving, Richard H.; Ford, William A.; and Miller, Robert R., II, 4,979,163, Cl. 370-32.100.

Fordonal, S.A.: *See*—
Yamazaki, Keiko; and Kawaji, Toshikuni, 4,978,531, Cl. 424-448.000.

Forrest, Gordon C.; Rattle, Simon J.; Robinson, Grenville A.; and Hill, Hugh A. O. 'Method of assay employing a magnetic electrode. 4,978,610, Cl. 435-7.000.

Fortin, J. Andre ; and Thomas, Laurence, to Universite Laval. Process for growing Pleurotus. 4,977,702, Cl. 47-1.100.

Forward Technology Industries, Inc.: *See*—
Burford, Russell L.; and Newkirk, Raymond K., 4,978,408, Cl. 156-281.000.

Fory, Werner: *See*—
Gass, Erfinders K.; Fory, Werner; Meyer, Willy; and Topfl, Werner, 4,978,383, Cl. 71-93.000.

Foster, Eugene L.: *See—*
Liljegren, Gordon E.; and Foster, Eugene L., 4,978,216, Cl. 353-28.000.

Foster, Marjorie A. Brush holder. 4,978,003, Cl. 206-217.000.

Foucher, Jean-Claude: *See—*
Charbonnel, Alain; and Foucher, Jean-Claude, 4,977,861, Cl. 122-483.000.

Fougeres, Michel, to Alizol S.A. Standable bag having an internal armature. 4,978,025, Cl. 222-105.000.

Fountain, Frank S.: *See—*
Falcoff, Allan F.; Fountain, Frank S.; and Pusey, Donald K., 4,977,853, Cl. 118-665.000.

Fountain Fresh, Inc.: *See—*
Clifford, Ronald E., 4,977,669, Cl. 30-41.000.

Fournier, Jacques: *See—*
Janssen, Sylvain; and Fournier, Jacques, 4,978,374, Cl. 55-165.000.

Fowler, Chris W.; Knight, Michael C.; and Nicholas, Anthony J., to BASF Corporation. Aqueous-based coating compositions comprising anionic polyurethane principal resin and anionic acrylic grind resin. 4,978,708, Cl. 524-507.000.

Framatome: *See—*
Griffaton, Jacques, 4,978,834, Cl. 219-121.630.

Frankel, Neil A.; Lindblad, Nero R.; Relyea, Herbert C.; and Meyer, Robert J., to Xerox Corporation. Fiber reinforced cleaning blade. 4,978,999, Cl. 355-299.000.

Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung E.V.: *See—*
Wennekers, Peter, 4,979,003, Cl. 357-22.000.

Frazee, Francis B.: *See—*
Bryans, Mark A.; Cline, James H.; Frazee, Francis B.; and Lehman, Lark E., 4,979,185, Cl. 375-20.000.

Freed, Herbert D., to Emmanel Corp. Strip mounted adapter supporting a lamp and featuring conductive spade engaging apparatus. 4,978,319, Cl. 439-638.000.

Freedman, George. System and method for preventing closure of passageways. 4,978,323, Cl. 600-12.000.

Freerksen, Donald L.: *See—*
Allen, Richard G.; and Freerksen, Donald L., 4,979,142, Cl. 364-767.000.

Frejaville, Serge; Mittelman, Philippe; Rajaonarivello, Claude; and Naud, Jean-Michel, to L'Air Liquide, Society Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process and container for supplying supercritical CO_2. 4,977,747, Cl. 62-50.100.

Frey, Otto; Semlitsch, Manfred; and Weber, Heinz, to Sulzer Brothers Limited. Plastic bone implant having a reinforced contact surface. 4,978,355, Cl. 623-16.000.

Fried, Bernard: *See—*
Letovsky, Howard; and Fried, Bernard, 4,978,300, Cl. 434-61.000.

Friedrich, Maria S.: *See—*
Seely, Michael J.; Friedrich, Maria S.; and Suresh, Dev D., 4,978,764, Cl. 558-319.000.

Friedrich Wilh. Schwing GmbH: *See—*
von Eckardstein, Karl-Ernst, 4,978,073, Cl. 239-419.300.

Frigg, Robert, to Synthes (U.S.A.). Fixation plate. 4,978,349, Cl. 606-67.000.

Friggstad, Terrance; and Hundeby, David R., to Flexi-Coil Limited. Resilient planar framework for supporting multiple groundworking tools. 4,977,964, Cl. 172-310.000.

Froutzis, Andrew. Combination removable seat frame and seat belt bar. 4,978,097, Cl. 248-503.100.

Fu, Shih-Lien; and Dent, Wu-Tsung, to Industrial Technology Research Institute. Electrical fuel pump for small motorcycle engine. 4,978,282, Cl. 417-360.000.

Fuchs, Karlheinz; and Munch, Norbert, to Hoechst Aktiengesellschaft. Economy chrome tanning. 4,978,361, Cl. 8-94.270.

Fuel Tech, Inc.: *See—*
Hofmann, John E.; Sun, William H.; and Luftglass, Bryan K., 4,978,514, Cl. 423-235.000.

Fuerst, Arpad: *See—*
Schreiter, Thomas; Fuerst, Arpad; and Wingen, Bernhard, 4,978,165, Cl. 296-216.000.

Fuhrmann, Jorg: *See—*
Stotzel, Gilbert; Fuhrmann, Jorg; and Schneider, Joachim, 4,978,233, Cl. 384-12.000.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Abe, Kunihiro; and Sakamoto, Masanori, 4,977,881, Cl. 123-489.000.
Hiwatashi, Yutaka; Kamimura, Katsuyoshi; and Mine, Atsushi, 4,978,848, Cl. 250-231.160.
Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 4,979,114, Cl. 364-424.050.
Takahashi, Akira, 4,979,115, Cl. 364-424.050.
Takahashi, Akira, 4,979,116, Cl. 364-424.050.
Takahashi, Masahiko, 4,977,798, Cl. 74-867.000.
Tanaka, Hiroshi, 4,977,988, Cl. 192-0.052.

Fuji Photo Film Co., Ltd.: *See—*
Akao, Mutsuo, 4,978,572, Cl. 428-323.000.
Horikawa, Kazuo, 4,978,197, Cl. 350-174.000.
Inoue, Nobuaki; Yagihara, Morio; and Takagi, Yoshihiro, 4,978,603, Cl. 430-265.000.
Ishizuka, Seiji, 4,977,852, Cl. 118-411.000.
Iwano, Haruhiko; and Nakagawa, Fumio, 4,978,433, Cl. 204-92.000.
Misawa, Takeshi; and Sawachi, Youichi, 4,979,024, Cl. 358-37.000.
Ohki, Nobutaka; Mihayashi, Keiji; Nakamura, Shigeru; and Fukuzawa, Hiroshi, 4,978,606, Cl. 430-505.000.
Okino, Yoshiharu, 4,978,976, Cl. 346-108.000.

Fuji Xerox Co., Ltd.: *See—*
Sugimoto, Junichi, 4,979,132, Cl. 364-520.000.

Fujii, Tatsumi: *See—*
Murai, Takaaki; and Fujii, Tatsumi, 4,978,691, Cl. 521-172.000.

Fujikawa, Shigeki: *See—*
Taniguchi, Katsuo; Fujikawa, Shigeki; and Kurano, Yoshito, 4,978,789, Cl. 564-305.000.

Fujikawa, Shuzo: *See—*
Nishihira, Keigo; Fujikawa, Shuzo; and Yamashita, Masayoshi, 4,978,766, Cl. 558-353.000.

Fujikura Ltd.: *See—*
Yamada, Takeshi; Onodera, Tsutomu; and Taya, Hiroyuki, 4,978,201, Cl. 350-320.000.

Fujikura, Yoshiaki: *See—*
Koshino, Junji; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,978,653, Cl. 512-21.000.

Fujimori, Tohru: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Fujio, Koji: *See—*
Takehana, Sakae; Fujio, Koji; and Ueda, Yasuhiro, 4,977,886, Cl. 128-4.000.

Fujisawa, Eiichi: *See—*
Hashimoto, Hiroshi; Aruga, Tatsuo; Fujisawa, Eiichi; and Obana, Yoshinari, 4,977,870, Cl. 123-195.00C.

Fujita, Akio; and Habu, Takeshi, to Konica Corporation. Silver halide photographic light-sensitive material improved on pinhole production. 4,978,602, Cl. 430-264.000.

Fujita, Manabu: *See—*
Koshino, Junji; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,978,653, Cl. 512-21.000.

Fujitsu Limited: *See—*
Hatagami, Toshifumi; Iwatsubo, Masahito; and Shinohara, Tooru, 4,978,902, Cl. 318-608.000.
Oyama, Mitsukazu, 4,979,204, Cl. 379-46.000.
Satoh, Kiyoshi; Fujiwara, Yoshiro; and Hashimoto, Kazushi, 4,978,879, Cl. 310-313.00A.
Tabata, Fumio; Sekiguchi, Hidenori; Kamada, Toru; and Sakata, Yuji, 4,979,195, Cl. 378-34.000.

Fujiwara, Akinori; Matsuoka, Hiroshi; Onoe, Susumu; and Kusaka, Kenji, to Bando Chemical Industries, Ltd. Method of bonding fibers to hydrogenated nitrile rubber. 4,978,409, Cl. 156-315.000.

Fujiwara, Yoshiro: *See—*
Satoh, Kiyoshi; Fujiwara, Yoshiro; and Hashimoto, Kazushi, 4,978,879, Cl. 310-313.00A.

Fukahori, Yoshihide; Kojima, Hiromu; and Ogino, Akihiko, to Bridgestone Construction. Anti-seismic bearing. 4,978,581, Cl. 428-492.000.

Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; Ichihara, Yukio; and Sasaki, Toshio, to Brother Kogyo Kabushiki Kaisha. Overlock sewing machine with a threading mechanism for easily threading a looper. 4,977,842, Cl. 112-199.000.

Fukuda, Kazuaki: *See—*
Kawata, Toshihiko; Mizuta, Ken; and Fukuda, Kazuaki, 4,979,066, Cl. 361-10.000.

Fukuda, Masatami: *See—*
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.

Fukuda, Naohisa: *See—*
Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, 4,978,761, Cl. 549-462.000.

Fukuda, Yutaka: *See—*
Kanno, Tatsuya; Takahashi, Ikuo; Sasaki, Kenichi; Iguichi, Yoshihiro; and Fukuda, Yutaka, 4,978,578, Cl. 428-412.000.

Fukuhara, Keiji, to Mazda Motor Corporation. Molding device. 4,978,290, Cl. 425-147.000.

Fukumoto, Takanori: *See—*
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.

Fukunaga, Seiji; Nakamura, Takashi; and Ono, Hiroyuki, to International Business Machines Corporation. Pulse generator and disk sector boundary signal generator with wow and flutter compensation. 4,978,847, Cl. 250-231.140.

Fukushima, Masato: *See—*
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

Fukuzawa, Hiroshi: *See—*
Ohki, Nobutaka; Mihayashi, Keiji; Nakamura, Shigeru; and Fukuzawa, Hiroshi, 4,978,606, Cl. 430-505.000.

Fuller Company: *See—*
Paul, Kermit D., 4,978,227, Cl. 366-101.000.

Fuller, Mark W.; and Robinson, Alan S., to Wet Designs. Fast acting airpowered water displays. 4,978,066, Cl. 239-12.000.

Fullerton, Larry W., to Phillips, Charles A., a part interest. Time domain radio transmission system. 4,979,186, Cl. 375-23.000.

Funaki, Shinsuke, to Konica Corporation. Image memory apparatus. 4,979,034, Cl. 358-93.000.

Funatsu, Chuhei, to Toyo Communication Equipment Co. Alarm suppressing system in aircraft collision avoidance system. 4,978,945, Cl. 340-961.000.

Furillo, Michael L. Method and means for protecting corneal endothelium and iris during IOL implantation. 4,978,353, Cl. 623-6.000.

Furrow, Roger W.; and Young, Harold R., to Gilbarco Inc. Multi-fuel dispenser with one nozzle per fueling position. 4,978,029, Cl. 222-1.000.

Furukawa Denki Kogyo Kabushiki Kaisha: *See*—
Akimoto, Mitsuru; Jimbo, Takamasa; Umemura, Kiyoshi; Iwase, Haruhiko; and Ogawa, Kenzirou, 4,978,914, Cl. 324-158.00F.

Furukawa Electric Co., Ltd., The: *See*—
Hasegawa, Masahiro; and Ueno, Seiichi, 4,978,191, Cl. 350-96.200.

Furuta, Fumio: *See*—
Takizawa, Akio; Furuta, Fumio; and Saito, Syozo, 4,978,966, Cl. 343-788.000.

Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device. 4,979,013, Cl. 357-55.000.

Furuya, Hiromi; and Hayakawa, Kunio, to Ricoh Company, Ltd. Phenolic compounds and recording material comprising the same. 4,978,651, Cl. 503-216.000.

Furuya, Tsutomu, to Showa Denko Kabushiki Kaisha. Process for production of tocopherols. 4,978,617, Cl. 435-125.000.

Fusion Systems Corporation: *See*—
Ury, Michael G., 4,978,891, Cl. 315-117.000.

Futagami, Mikio: *See*—
Yuyama, Masahiro; Moritani, Masahiko; and Futagami, Mikio, 4,978,702, Cl. 524-266.000.

Futagi, Eiji: *See*—
Takigawa, Shogo; Yusa, Seiichi; and Futagi, Eiji, 4,977,997, Cl. 198-374.000.

Futami, Tohru; and Yuzuriha, Naoki, to Nissan Motor Co., Ltd. System and method for controlling posture of steering wheel for vehicle. 4,978,137, Cl. 280-775.000.

Gaalema, Steve D.: *See*—
Morse, Arthur L.; Gaalema, Steve D.; Keimel, Ingrid M.; and Hewitt, Mary J., 4,978,872, Cl. 307-490.000.

Gaewsky, John P.: *See*—
Petrakos, Stephanie; and Gaewsky, John P., 4,978,892, Cl. 315-358.000.

Galanakis, Claire T.: *See*—
Luijtjes, Nicolaas G.; Galanakis, Claire T.; and Whalen, Barry H., 4,978,835, Cl. 219-121.640.

Gale, John C.; and Lang, Howard J. Tapping fluid supply pipes. 4,978,255, Cl. 408-1.00R.

Gale, Rebeca J.: *See*—
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebeca J., 4,978,908, Cl. 324-158.00R.

Galileo Electro-Optics Corporation: See—
White, Paul L.; and Laprade, Bruce N., 4,978,885, Cl. 313-103.0CM.

Gallup, Darrell L.; and Featherstone, John L., to Union Oil Company of California. Method of filtering a brine. 4,978,457, Cl. 210-747.000.

Ganek, Alan G.: *See*—
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

Gannon, James E.; and Thornburgh, Scott, to Great Lakes Chemical Corporation. Control of biofouling in aqueous systems by non-polymeric quaternary ammonium polyhalides. 4,978,685, Cl. 514-642.000.

Garrido, Alfonso; Sevilleja, Jose; and Cabanas, Julian, to Otis Elevator Company. Mount system for elevator guide rails. 4,977,983, Cl. 187-95.000.

Gass, Erfinders K.; Fory, Werner; Meyer, Willy; and Topfl, Werner, to Ciba-Geigy Corporation. N-phenylsulfonyl-N'-triazinylureas. 4,978,383, Cl. 71-93.000.

Gasser, Daniel: *See*—
Baiker, Alfons; and Gasser, Daniel, 4,978,513, Cl. 423-245.300.

Gasser, Oswald: *See*—
Wilhelm, Klaus; Bauer, Johann; Schmitt, Werner; Herold, Wolf-Dietrich; Koran, Peter; Wanek, Erich; and Gasser, Oswald, 4,978,359, Cl. 623-23.000.

Gaston County Dyeing Machine Co.: *See*—
Hacker, George G.; Turner, James K.; and Hornbuckle, Charles R., 4,977,761, Cl. 68-177.000.

Gaudenzi, Gene J.: *See*—
Hausman, Kristen A.; Gaudenzi, Gene J.; Mosley, Joseph M.; and Tempest, Susan L., 4,978,927, Cl. 331-57.000.

Gazelle Microcircuits, Inc.: *See*—
Fitzpatrick, Mark E.; and Gouldsberry, Gary R., 4,978,904, Cl. 323-313.000.

GBE International PLC: *See*—
Ray, Eric T.; and Vigg, Peter A., 4,977,907, Cl. 131-290.000.

GE Fanuc Automation North America Inc.: *See*—
Davis, Richard K.; and Curtin, Keith W., 4,979,122, Cl. 364-483.000.

Gebruder Linck Maschinenfabrik "Gatterlinck" GmbH & Co. KG: *See*—
Gonner, Sigmar; and Braun, Heinz-Hubert, 4,977,940, Cl. 144-255.000.

Gedevelop Electronics AB: *See*—
Ransheim, Anders, 4,978,859, Cl. 250-560.000.

Geesey, Harold D.: *See*—
Allen, Dennis; Del Fava, Donald; Geesey, Harold D.; Koht, Lowell I.; McClintic, Mark S.; Newton, Dean A.; and Petro, Timothy L., Sr., 4,978,194, Cl. 350-96.230.

Gehret, Jean-Claude, to Ciba-Geigy Corporation. C(29)-carbonyloxymilbemycin derivatives for controlling parasitic pets of animals and plants. 4,978,677, Cl. 514-450.000.

Geldman, John S.; and Estakhri, Petro, to Cirrus Logic, Inc. Burst mode error detection and definition. 4,979,173, Cl. 371-39.100.

Gelinas, Robert G.; and Radogna, Thomas V., to Data General Corporation. Technique for providing a sign/magnitude subtraction operation in a floating point computation unit. 4,979,141, Cl. 364-787.000.

Geller, Bernard D.: *See*—
Gupta, Ramesh K.; and Geller, Bernard D., 4,978,932, Cl. 333-81.00R.

Gellf, Gerard: *See*—
Biton, Jacques; Gellf, Gerard; Michel, Jean-Marc; Paul, Francois B.; and Monsan, Pierre F., 4,978,751, Cl. 536-123.000.

Gemmell, David; and Irvine, Duncan A., to Possum Controls Limited. Control system. 4,979,094, Cl. 364-188.000.

General Atomics: *See*—
Stansfield, Orlin M.; and Schleicher, Robert W., Jr., 4,978,480, Cl. 264-0.500.

General Electric CGR S.A.: *See*—
Lieutaud, Olivier; and Marie, Alain, 4,979,196, Cl. 378-37.000.

General Electric Company: *See*—
Adiutori, Eugene F.; and Cahill, James E., 4,978,230, Cl. 374-43.000.

Brown, Sterling B.; McFay, Dennis J.; Yates, John B., III; and Lee, Gim F., 4,978,715, Cl. 525-92.000.

Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,978,039, Cl. 222-592.000.

Castonguay, Roger N.; and Morris, Robert A., 4,978,816, Cl. 200-43.140.

Cueman, Michael K.; Thomas, Lewis J., III; Trzaskos, Casmir R.; Matula, August D.; and Austin, Michael J., 4,979,199, Cl. 378-121.000.

Durkee, William D., Jr.; and Muller, Philip J., 4,977,935, Cl. 141-99.000.

Iacovangelo, Charles D., 4,978,559, Cl. 427-304.000.

Indig, Maurice E.; and King, Laura L. H., 4,978,921, Cl. 324-446.000.

Isnardi, Michael A., 4,979,020, Cl. 358-12.000.

MacLean, Malcolm K.; and Daniels, Mark E., 4,978,071, Cl. 239-265.190.

Ritter, Ann M.; Siemers, Paul A.; and Spriggs, Donald R., 4,978,585, Cl. 428-614.000.

Shah, Rajendra K., 4,978,896, Cl. 318-254.000.

Tiearney, Thomas C., Jr.; Love, William D.; and Moorman, David K., 4,978,051, Cl. 228-122.000.

General Electric Company, plc, The: *See*—
Roberts, Malcolm T.; Robins, Michael P.; and Sharrott, Ian E., 4,979,113, Cl. 364-424.020.

General Foods Limited: *See*—
Newman, Alec T.; and Zeller, John, 4,978,024, Cl. 220-90.400.
Newman, Alec T.; and Rhodes, David, 4,978,032, Cl. 221-119.000.

General Instrument Corporation: *See*—
Marz, Daniel, 4,979,230, Cl. 455-3.000.

General Motors Corporation: *See*—
Borrousch, Eugene W.; and Green, Frank R., 4,977,946, Cl. 164-57.100.

Chandley, George D., 4,977,948, Cl. 164-255.000.

Partin, Dale L.; Heremans, Joseph P.; and Morelli, Donald T., 4,978,938, Cl. 338-32.00R.

Weinand, Louis H., 4,978,074, Cl. 239-585.000.

General Sciences, Inc.: *See*—
Juneau, Paul W., Jr.; and Semon, Howard, 4,978,400, Cl. 149-21.000.

General Signal Corporation: *See*—
Engle, Thomas H., 4,978,178, Cl. 303-13.000.

Genick, Raymond M. Foldable traffic barrier. 4,977,697, Cl. 40-606.000.

George, John E.: *See*—
Durnwirth, Roy K., Jr.; George, John E.; and Morton, Kim L., 4,978,423, Cl. 156-659.100.

George, John W.; and Taylor, Laurence D., to American Sterilizer Company. Disposable biohazardous waste material container. 4,978,028, Cl. 220-403.000.

Gerber Products Company: *See*—
Weick, Robert D., 4,978,022, Cl. 220-23.000.

Gerber Scientific Instrument Company, The: *See*—
Straayer, Ronald J., 4,978,184, Cl. 350-6.300.

Gerrans, Wilbur; and Truc, James A., to Pakon, Inc. Photograph slide sleeving system. 4,977,725, Cl. 53-501.000.

Gershuni, Alexandr N.: *See*—
Maisotsenko, Valery S.; and Gershuni, Alexandr N., 4,977,753, Cl. 62-121.000.

Gerstenfeld, Arthur; Gualtieri, Michael N.; and Moody, Thomas D., to UFA Inc. Air traffic control training system. 4,979,137, Cl. 364-578.000.

Gesslein, Bruce W.; Guth, Jacob J.; Mintz, Gilbert R.; Reinhart, Gale M.; and Smith, Laurence R., to Inolex Chemical Company. Hair and skin conditioning agents and methods. 4,978,526, Cl. 424-70.000.

Gewerkschaft Eisenhutte Westfalia, GmbH: *See*—
Sprenger, Gerhard; and Dodt, Jurgen, 4,978,248, Cl. 405-292.000.

Ghaffari, Mehrdad, to Boeing Company. Apparatus and method for a data processing system interface having multiple bit protocol signals. 4,979,095, Cl. 364-200.000.

Ghose, Sanjoy; Battu, Ramgopal; and Jabbari, Iraj, to Seagate Technology, Inc. Design for an actuator arm for a disc drive. 4,979,063, Cl. 360-106.000.

Giannini, Umberto: *See—*
Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, 4,978,648, Cl. 502-127.000.

Gierut, Frederick J.: *See—*
Edgley, Richard R.; Gierut, Frederick J.; and Lenz, William, 4,978,315, Cl. 439-441.000.

Gilbarco Inc.: *See—*
Furrow, Roger W.; and Young, Harold R., 4,978,029, Cl. 222-1.000.

Gilhousen, Klein S.; Jacobs, Irwin M.; and Weaver, Lindsay A., Jr., to Qualcomm, Inc. Alternating sequential half duplex communication system. 4,979,170, Cl. 370-104.100.

Gill, Robert C.: *See—*
Johnson, Nancy C.; Gill, Robert C.; Leahy, John F.; Gotzmer, Carl, Jr.; Fillman, Harold T.; and , 4,978,482, Cl. 264-3.100.

Gillner, Manfred; Wlaschitsch, Josef; and Nuding, Werner, deceased (by Nuding, Ursula, legal representative), to Vegla Vereinigte Glaswerke GmbH. Traffic mirror. 4,978,207, Cl. 350-631.000.

Giordano, Raymond L.; and Vulih, Salomon, to Harris Corporation. Simplified transistor base current compensation circuitry. 4,978,868, Cl. 307-296.600.

Giorgianni, Edward J.: *See—*
Alessi, Paula J.; Giorgianni, Edward J.; and Madden, Thomas E., 4,979,032, Cl. 358-76.000.

Giorgio, Pessina: *See—*
Perobelli, Aldo; and Giorgio, Pessina, 4,977,726, Cl. 53-542.000.

Gipson, James H., Jr. Quick release jack. 4,978,104, Cl. 254-420.000.

Givler, Omar R., to Portage Electric Products, Inc. Spacer for thermostat stack. 4,978,937, Cl. 337-372.000.

Gladstone, Ernest. Method of riddling fermented bottled wines. 4,978,538, Cl. 426-8.000.

Glomski, Ronald L.: *See—*
Ainsworth, Oliver C.; and Glomski, Ronald L., 4,978,703, Cl. 524-298.000.

Glugla, Ronald: *See—*
Farrell, Kenneth L.; Cona, John A.; Glugla, Ronald; and Bly, Lloyd G., 4,977,838, Cl. 110-173.00R.

GMD Engineered Systems, Inc.: *See—*
Andrews, Robert S. L.; and Reier, Gerald J., 4,978,076, Cl. 241-5.000.

Gnilitskaya, Alla I.: *See—*
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Gnoinski, Richard, to E. J. Brooks Co. Rotatable seal. 4,978,026, Cl. 220-214.000.

Goddard, Joan S.; Overby, Wayne A.; and Valent, James A., to International Business Machines Corporation. Pel placement correction in the scan dimension of a multiple beam laser scanning system. 4,978,849, Cl. 250-235.000.

Goeddel, Thomas W.: *See—*
Benvenuto, Nevio; and Goeddel, Thomas W., 4,979,211, Cl. 381-43.000.

Goetz, Howard V.; and Springer, Richard A., to Tektronix, Inc. Method and apparatus for reformatting print data. 4,978,971, Cl. 346-1.100.

Gogniat, Paul, to Montres Rado S.A. Watch case provided with a cap of hard material. 4,979,157, Cl. 368-276.000.

Goko, Nobuaki; Uehara, Yumito; Kato, Hideshige; and Matsuda, Yukimasa, to Mitsubishi Kasei Corporation. Method for producing a propylene-α-olefin block copolymer. 4,978,722, Cl. 525-255.000.

Golan, Igal: *See—*
Mesica, Zuri; and Golan, Igal, 4,977,757, Cl. 63-15.000.

Golden Valley Microwave Foods, Inc.: *See—*
Bley, Michael E., 4,978,555, Cl. 426-627.000.

Goldenberg, Merrill, to Ciba-Geigy Corporation. Polyvinyl alcohol derivatives containing pendant vinylic monomer reaction product units bound through ether groups and hydrogel contact lenses made therefrom. 4,978,713, Cl. 525-61.000.

Goldenfield, Mark P.; Lambert, David V.; and Shannon, Robert E., to Westinghouse Electric Corp. Method for nondestructive measurement of heat affected zone of identification code on nuclear fuel rod. 4,978,917, Cl. 324-226.000.

Goldstar Co., Ltd.: *See—*
Yang, Keun Y., 4,978,202, Cl. 350-331.00R.
Yang, Keun Y., 4,979,123, Cl. 364-498.000.

Gonner, Sigmar; and Braun, Heinz-Hubert, to Gebruder Linck Maschinenfabrik "Gatterlinck" GmbH & Co. KG. Device for straightening boards. 4,977,940, Cl. 144-255.000.

Gorlitz, Frank-Otto; and Rusch, Friedrich-Wilheim, to Buhler GmbH. Sorting machine for grained products. 4,978,011, Cl. 209-694.000.

Gosselin, Peter G.: *See—*
Kock, Ronald W.; Gosselin, Peter G.; and Reiboldt, H. Norman, 4,977,826, Cl. 99-516.000.

Gotanda, Masakazu: *See—*
Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara, Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, 4,977,902, Cl. 128-804.000.

Goto, Akihiro: *See—*
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, to Takeda Chemical Industries, Ltd. 5-hydroxy-2-substituted-2,4,6,7-tetramethyl-2,3-dihydrobenzofurans. 4,978,761, Cl. 549-462.000.

Goto, Yukihisa: *See—*
Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,978,385, Cl. 71-94.000.

Gotzmer, Carl, Jr.: *See—*
Johnson, Nancy C.; Gill, Robert C.; Leahy, John F.; Gotzmer, Carl, Jr.; Fillman, Harold T.; and , 4,978,482, Cl. 264-3.100.

Gouda, Kazuhiko, to Kabushiki Kaisha Toshiba. Endoscope with scope section of adjustable rigidity. 4,977,887, Cl. 128-4.000.

Gouldsberry, Gary R.: *See—*
Fitzpatrick, Mark E.; and Gouldsberry, Gary R., 4,978,904, Cl. 323-313.000.

Goymann, Volkmar; Anapliotis, Emmanuel; and Kranz, Curt, to Mecron medizinische Produkte GmbH. Endoprosthesis. 4,978,357, Cl. 623-18.000.

Grabec, D. Igor: *See—*
Sachse, Wolfgang H.; and Grabec, D. Igor, 4,979,124, Cl. 364-507.000.

Grabovac, Bosko; and Kurtovic, Zlatko, to Consolidated Devices Inc. Torque transducer. 4,977,775, Cl. 73-1.00C.

Grabow, Ralf R.: *See—*
Vonderau, Werner; and Grabow, Ralf R., 4,978,478, Cl. 261-35.000.

Graco Inc.: *See—*
Lind, Robert J.; and Karwoski, Stanley G., 4,978,075, Cl. 239-690.000.

Grafe, Ingomar; Schickaneder, Helmut; and Ahrens, Kurt H., to Heumann Pharma GmbH & Co. Process for the preparation of 2,6-dichlorodiphenylaminoacetic acid derivatives. 4,978,773, Cl. 560-47.000.

Graham, Gray. Tree forest cemetery. 4,977,652, Cl. 27-1.000.

Graham, Peter: *See—*
Causse, Pierre; Graham, Peter; Maury, Bernard; and Walter, Jean-Claude, 4,978,880, Cl. 310-324.000.

Graham, Thomas G.: *See—*
Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., 4,979,209, Cl. 379-399.000.

Grainger, Oswald J., to Bruce Grainger. Method of constructing masonry panels. 4,977,731, Cl. 52-747.000.

Granata, Samuel J., Jr.; and Woodle, Boyd M., to United States of America, Energy. Dry compliant seal for phosphoric acid fuel cell. 4,978,590, Cl. 429-35.000.

Grand Haven Stamped Products Company, div. of JSJ Corporation: *See—*
Osborn, Charles, 4,977,789, Cl. 74-475.000.

Grant, Lloyd L. Diesel engine. 4,977,864, Cl. 123-50.00B.

Gravier, Michel, to Jammes Industrie S.A. Automatable bending machine having crenelated rolls. 4,977,770, Cl. 72-175.000.

Great Lakes Chemical Corporation: *See—*
Gannon, James E.; and Thornburgh, Scott, 4,978,685, Cl. 514-642.000.

Green, Alex E. S.; Green, Bruce A. S.; and Wagner, John C., to University of Florida. Radiation enhancement in oil/coal boilers converted to natural gas. 4,978,367, Cl. 44-281.000.

Green, Bruce A. S.: *See—*
Green, Alex E. S.; Green, Bruce A. S.; and Wagner, John C., 4,978,367, Cl. 44-281.000.

Green, David T., to United States Surgical Corporation. Three staple drive member. 4,978,049, Cl. 227-178.000.

Green, Frank R.: *See—*
Borrousch, Eugene W.; and Green, Frank R., 4,977,946, Cl. 164-57.100.

Green, Peter: *See—*
Winwood, Hugh; and Green, Peter, 4,978,268, Cl. 414-409.000.

Greenman, Murray: *See—*
Duncan, Gerald; Shacklock, Frank W.; and Greenman, Murray, 4,978,058, Cl. 236-12.120.

Greenwood, Marvin H. Recreational device having rings. 4,978,120, Cl. 272-85.000.

Greeson, Ewell E. Cutting guide for portable router. 4,977,938, Cl. 144-134.00D.

Gregoli, Armand A.; Hamshar, John A.; Olah, Andrew M.; Riley, Christopher J.; and Rimmer, Daniel P., to Canadian Occidental Petroleum Ltd. Preparation of improved stable crude oil transport emulsions. 4,978,365, Cl. 44-301.000.

Gregory, Stephen E., Jr. Roof ventilation baffle. 4,977,714, Cl. 52-95.000.

Greif, Norbert: *See—*
Fikentscher, Rolf; Greif, Norbert; Oppenlaender, Knut; and Stork, Karl, 4,978,780, Cl. 562-42.000.

Grela, Peter V.: *See—*
Dean, Robert C., Jr.; Grela, Peter V.; Karkare, Subhash B.; and Runstadler, Peter W., Jr., 4,978,616, Cl. 435-70.300.

Grenier, Maurice; and Mazieres, Philippe, to l'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process and plant for separating air and producing ultra-pure oxygen. 4,977,746, Cl. 62-22.000.

Gribshaw, Franklin C.: *See*—
Lang, Paul W.; and Gribshaw, Franklin C., 4,979,026, Cl. 358-64.000.

Griffaton, Jacques, to Framatome. Method and apparatus for remotely welding a bush inside a tube, in particular in a steam generator in a nuclear power station. 4,978,834, Cl. 219-121.630.

Grim, Tracy E., to Royce Medical Company. Variable support ankle brace. 4,977,891, Cl. 128-80.00H.

Grimm, Robert A.: *See*—
Schmidt, Wayne W.; Benjamin, William P.; and Grimm, Robert A., 4,978,825, Cl. 219-104.300.

Grimminger, Albert: *See*—
Pontow, Bernd; Wenning, Hans-Peter; Grimminger, Albert; and Strecker, Jurgen, 4,978,369, Cl. 48-197.00R.

Grimshaw, Michael N.; Albers, Stephen J.; and Rust, Ralph J., to Cincinnati Milacron Inc. Composite tape laying machine having scrap removal and method. 4,978,417, Cl. 156-574.000.

Grinberg, Yakov M.: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Groner, Gabriel F.: *See*—
Malsheen, Bathsheba J.; Groner, Gabriel F.; and Williams, Linda D., 4,979,216, Cl. 381-52.000.

Grooms, Joseph D.: *See*—
Ewert, Charles F.; and Grooms, Joseph D., 4,977,843, Cl. 114-109.000.

Grunzweig and Hartmann und Glasfaser AG: *See*—
Bissinger, Fridolin; Krzyzanowski, Erich; and Wittmoser, Adalbert, 4,977,945, Cl. 164-235.000.

Grutsch, James F.: *See*—
Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., 4,977,839, Cl. 110-346.000.

GTE Laboratories Incorporated: *See*—
Kheradpir, Shaygan, 4,979,118, Cl. 364-436.000.

GTE Products Corporation: *See*—
Bouchard, Andre C.; and Bessone, Carlo S., 4,978,180, Cl. 315-73.000.
Devir, Daniel D., 4,979,082, Cl. 362-226.000.

GTE Valenite Corporation: *See*—
Juengel, Richard O., 4,978,857, Cl. 250-551.000.

Gualtieri, Michael N.: *See*—
Gerstenfeld, Arthur; Gualtieri, Michael N.; and Moody, Thomas D., 4,979,137, Cl. 364-578.000.

Guesdon, Jean-Luc: *See*—
Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, 4,978,749, Cl. 536-27.000.

Guetle, Norbert J., Jr., to Pease Industries, Inc. Exterior door construction. 4,977,705, Cl. 49-478.000.

Guichard, Jacques; and Eude, Geard, to Etat Francais represente par le Ministere des Postes, des Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications), Organized under the Law of the French Republic. Variable threshold quantification process in encoding by transformation for the transmission of image signals. 4,979,038, Cl. 358-133.000.

Gupta, Ramesh K.; and Geller, Bernard D., to Communications Satellite Corporation. Microwave digitally controlled solid-state attenuator having parallel switched paths. 4,978,932, Cl. 333-81.00R.

Gurwicz, David, to Nada Electronics Limited. Electric discharge machining power supply circuit. 4,978,829, Cl. 219-69.130.

Guth, Jacob J.: *See*—
Gesslein, Bruce W.; Guth, Jacob J.; Mintz, Gilbert R.; Reinhart, Gale M.; and Smith, Laurence R., 4,978,526, Cl. 424-70.000.

H-C Industries, Inc.: *See*—
McBride, Stephen W., 4,978,017, Cl. 215-252.000.

H. Krantz GmbH & Co.: *See*—
Schiffers, Theo, 4,977,651, Cl. 26-106.000.

Haag, Werner O.: *See*—
Bell, Weldon K.; and Haag, Werner O., 4,978,689, Cl. 518-709.000.

Habu, Takeshi: *See*—
Fujita, Akio; and Habu, Takeshi, 4,978,602, Cl. 430-264.000.

Hach Associates, Inc.: *See*—
Postma, Robert C., 4,978,568, Cl. 428-192.000.

Hacker, George G.; Turner, James K.; and Hornbuckle, Charles R., to Gaston County Dyeing Machine Co. Liquor applying nozzle for a textile dyeing machine. 4,977,761, Cl. 68-177.000.

Hackman, Lloyd E., to Ribbon Technology Corporation. Apparatus for flow control of molten material by force detection. 4,977,951, Cl. 164-453.000.

Hadjizadeh-Amini, Zahra: *See*—
Liu, Yow-Juang; and Hadjizadeh-Amini, Zahra, 4,978,627, Cl. 437-44.000.

Hadwiger, Lee A., to Washington State University Research Foundation. Method for treating cereal crop seed with chitosan to enhance yield, root growth, and stem strength. 4,978,381, Cl. 71-77.000.

Haefling, James F.: *See*—
Stierman, Roger J.; Heinen, K. Gail; Ramsey, Thomas; and Haefling, James F., 4,979,015, Cl. 357-69.000.

Haga, Toru; Nagano, Eiki; Sato, Ryo; and Morita, Kouichi, to Sumitomo Chemical Company, Limited. Benzotriazoles, and their production and use. 4,978,787, Cl. 564-218.000.

Hagan, John A.: *See*—
Apps, William P.; Rehrig, James B.; and Hagan, John A., 4,978,002, Cl. 206-201.000.

Hagiwara, Taro: *See*—
Nakamura, Katsumi; Miyazaki, Kenichi; Hagiwara, Taro; and Kuriyama, Hiroshi, 4,978,164, Cl. 296-197.000.

Hagman, Ronald L.: *See*—
Beausoleil, Raymond G.; Hagman, Ronald L.; and McGarvey, John A., 4,979,178, Cl. 372-20.000.

Hagmann, Paul; and Hardt, Manfred, to William Prym-Werke GmbH, & Co. KG. Apparatus for orienting articles in riveting presses and the like. 4,978,046, Cl. 227-4.000.

Haines, Bernard M., to Schweich, Jerome F. Sensory transmitting membrane device. 4,977,903, Cl. 128-842.000.

Hakansson, Christer L.: *See*—
Quirk, Jennifer M.; Harsy, Stephen G.; and Hakansson, Christer L., 4,978,793, Cl. 564-487.000.

Halas, Linda A., to Procter & Gamble Company, The. Stable liquid detergents containing anionic surfactant and monosulfonated brightener. 4,978,475, Cl. 252-549.000.

Halbert, Thomas R.: *See*—
Coyle, Catherine L.; Halbert, Thomas R.; and Stiefel, Edward I., 4,978,464, Cl. 252-42.700.

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Hall, Mitchell A., to Monarch Tool & Manufacting Company. Coin chute construction. 4,977,995, Cl. 194-235.000.

Haller, Ingo; Spindler, Ernst; Heisler, Manfred; and Kleine, Willi, to Wacker-Chemie GmbH. Novel matting agent and its use. 4,978,718, Cl. 525-239.000.

Halliburton Company: *See*—
Himes, Ronald E.; and Simon, David E., 4,977,962, Cl. 166-305.100.

Halliburton Geophysical Services, Inc.: *See*—
Barr, Frederick J., 4,979,150, Cl. 367-24.000.

Halloran, John W.: *See*—
Venkataswamy, Krishna; Waack, Richard; Novich, Bruce E.; and Halloran, John W., 4,978,643, Cl. 501-94.000.

Hallworth, Gerald, to Dow Chemical Company, The. Formation of flexible laminates by bonding a backing to a pre-coated substrate. 4,978,402, Cl. 156-77.000.

Hamada, Jun-ichi; Itaya, Masahiko; and Motohashi, Mitsuo, to Konica Corporation. Paper separating charger capable of discharging currents of various duty factors and frequencies. 4,979,000, Cl. 355-315.000.

Hamada, Masataka: *See*—
Taniguchi, Nobuyuki; Karasaki, Toshihiko; Ishida, Tokuji; Hamada, Masataka; and Norita, Toshio, 4,979,045, Cl. 358-227.000.

Hamada, Tetsurou: *See*—
Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, 4,977,989, Cl. 192-56.00R.

Hamada, Toshihiko: *See*—
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.

Hamatani, Toshiji: *See*—
Yamazaki, Shunpei; Inujima, Takashi; Hamatani, Toshiji; Konuma, Toshimitsu; Sakama, Mitsunori; Kobayashi, Ippei; and Yamaguchi, Toshiharu, 4,978,203, Cl. 350-339.00R.

Hamel, Gregory R.: *See*—
Zerod, Richard D.; and Hamel, Gregory R., 4,978,926, Cl. 330-279.000.

Hamilton, Chris A., to Dialogic Corporation. Method and apparatus for identifying speech in telephone signals. 4,979,214, Cl. 381-46.000.

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Hamshar, John A.: *See*—
Gregoli, Armand A.; Hamshar, John A.; Olah, Andrew M.; Riley, Christopher J.; and Rimmer, Daniel P., 4,978,365, Cl. 44-301.000.

Hamuro, Mitsuroh; Hata, Yoshitaka; Hayashi, Shigeo; and Takahashi, Akihiko, to Murata Manufacturing Co., Ltd. Apparatus for measuring characteristics of chip electronic components. 4,978,913, Cl. 324-158.00F.

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Ling, Zhang A.; and Han, Wang C., 4,978,231, Cl. 383-11.000.

Hanada, Kouichi: *See*—
Kosugi, Akira; and Hanada, Kouichi, 4,978,111, Cl. 271-3.100.

Hansa Metallwerke AG: *See*—
Oberdorfer, Hans, 4,977,920, Cl. 137-218.000.

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Hanson, Jay L., to Thermo King Corporation. Transport refrigeration including methods and apparatus for optmizing same. 4,977,752, Cl. 62-115.000.

Hara, Junichiro: *See*—
Ogihara, Yoshiyuki; Hara, Junichiro; and Takahashi, Hideo, 4,978,061, Cl. 236-49.300.

Hara, Ryuichi: *See*—
Mizuno, Toru; Hara, Ryuichi; and Nishi, Hiroji, 4,979,127, Cl. 364-513.000.

Harada, Ichiya: *See*—
Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, 4,978,740, Cl. 528-272.000.

Harada, Koukichi: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Harada, Satoru: *See*—
Akeyoshi, Kazuyuki; Matsumoto, Takeshi; Harada, Satoru; Nakamura, Masatake; and Ishikawa, Toshiyuki, 4,978,812, Cl. 174-35.0MS.

Harada, Toshiaki: *See*—
Ishikawa, Noriyoshi; Inui, Toshiharu; Tamura, Yasuyuki; and Harada, Toshiaki, 4,978,968, Cl. 346-1.100.

Haraguchi, Shinya; and Nakahara, Kiyonori, to Sony Corporation. Cordless telephone. 4,979,205, Cl. 379-61.000.

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Harder, Willard J., to Ternes Register Systems. Image control board. 4,977,683, Cl. 33-621.000.

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Hagmann, Paul; and Hardt, Manfred, 4,978,046, Cl. 227-4.000.

Harris, Clark E.; and Shaw, Joel R., to Eastman Kodak Company. Spool for photographic film or other web material. 4,978,084, Cl. 242-74.000.

Harris Corporation: *See*—
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Martz, Donald R.; and Bezjak, Greg W., 4,979,232, Cl. 455-78.000.
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Seefeldt, David F.; Iacoponi, Michael J.; and Vail, David K., Jr., 4,978,633, Cl. 437-51.000.

Harris, Robert S.: *See*—
Thompson, Robert H.; Szlaga, Emil; and Harris, Robert S., 4,977,936, Cl. 141-312.000.

Harris, William E., Jr.: *See*—
Bushman, Ronald C.; and Harris, William E., Jr., 4,978,010, Cl. 209-663.000.

Harsigny, Christian: *See*—
Cornu, Daniel; Harsigny, Christian; and Thiebaut, Jean, 4,978,211, Cl. 351-159.000.

Harsy, Stephen G.: *See*—
Quirk, Jennifer M.; Harsy, Stephen G.; and Hakansson, Christer L., 4,978,793, Cl. 564-487.000.

Hartfield, Peter T.: *See*—
Sellwood, Raymund E.; and Hartfield, Peter T., 4,979,087, Cl. 363-34.000.

Hartmann, Heinrich: *See*—
Pfohl, Sigberg; Kroener, Michael; Hartmann, Heinrich; and Denzinger, Walter, 4,978,427, Cl. 162-168.200.

Hartmann, Ralf; and Reus, Jurgen, to VDO Adolf Schindling AG. Circuit for regulating a pulsating current. 4,978,865, Cl. 307-140.000.

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Hartwell, David W.: *See*—
Triolo, Victoria M.; Bloom, Elbert; and Hartwell, David W., 4,979,097, Cl. 364-200.000.

Hartwig, Jurgen: *See*—
Kraatz, Udo; Kysela, Ernst; Hartwig, Jurgen; and Becker, Benedikt, 4,978,382, Cl. 71-92.000.

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Lynde, Gerald D.; and Harvey, Harold H., Jr., 4,978,260, Cl. 166-55.600.

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Ohmori, Naoto; Matsuura, Yasuhiro; Hasegawa, Hirofumi; Kojima, Hiroaki; and Yamada, Yukio, 4,978,977, Cl. 346-108.000.

Hasegawa, Jun: *See*—
Uehara, Masao; Sasagawa, Katsuyoshi; Yamashita, Shinji; Sasaki, Masahiko; Saito, Katsuyuki; Kanoo, Masahide; Uchikubo, Akinobu; Nakagawa, Takehiro; and Hasegawa, Jun, 4,979,035, Cl. 358-98.000.

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Hashimoto, Hiroshi; Aruga, Tatsuo; Fujisawa, Eiichi; and Obana, Yoshinari, to Nissan Motor Co., Ltd. Internal combustion engine. 4,977,870, Cl. 123-195.00C.

Hashimoto, Hiroshi: *See*—
Noguchi, Akio; and Hashimoto, Hiroshi, 4,978,980, Cl. 346-150.000.

Hashimoto, Kazushi: *See*—
Satoh, Kiyoshi; Fujiwara, Yoshiro; and Hashimoto, Kazushi, 4,978,879, Cl. 310-313.00A.

Hata, Yoshitaka: *See*—
Hamuro, Mitsuroh; Hata, Yoshitaka; Hayashi, Shigeo; and Takahashi, Akihiko, 4,978,913, Cl. 324-158.00F.

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Sato, Siro; and Hatakeyama, Shiro, 4,978,115, Cl. 271-124.000.

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Haukoos, Dana S.: *See*—
Crane, Carl D., III; and Haukoos, Dana S., 4,977,971, Cl. 180-8.300.

Hausman, Kristen A.; Gaudenzi, Gene J.; Mosley, Joseph M.; and Tempest, Susan L., to International Business Machines Corporation. Programmable voltage controlled ring oscillator. 4,978,927, Cl. 331-57.000.

Havira, R. Mark: *See*—
Ekstrom, Michael P.; and Havira, R. Mark, 4,979,151, Cl. 367-35.000.

Hawkins, Glynn J., to Hempsted Glazing Systems Ltd. Glazing bars and glazing assemblies. 4,977,716, Cl. 52-235.000.

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Furuya, Hiromi; and Hayakawa, Kunio, 4,978,651, Cl. 503-216.000.

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Ohtani, Yasuaki; Kubo, Isamu; Ohtake, Kohji; and Hayashi, Kazuo, 4,978,414, Cl. 156-494.000.

Hayashi, Kenji: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Hayashi, Masaaki: *See*—
Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara, Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, 4,977,902, Cl. 128-804.000.

Hayashi, Seizo: *See*—
Hirano, Akihiro; and Hayashi, Seizo, 4,977,640, Cl. 15-339.000.

Hayashi, Shigeo: *See*—
Hamuro, Mitsuroh; Hata, Yoshitaka; Hayashi, Shigeo; and Takahashi, Akihiko, 4,978,913, Cl. 324-158.00F.

Hayashi, Shirou: *See*—
Uemura, Tadashi; and Hayashi, Shirou, 4,978,294, Cl. 432-103.000.

Hayashi, Tetsuaki: *See*—
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.

Hayes, Thomas H., to Anchor Hocking Corporation. Tamper indicating closure having retaining hoop with relief windows. 4,978,016, Cl. 215-252.000.

Haygood, David L., to Edward S. Robbins, III. Extrudable anti-static polyvinyl chloride resin compositions, and shaped articles formed thereof. 4,978,700, Cl. 524-156.000.

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Hazelton, Donald R.; and Puydak, Robert C., to Exxon Chemical Patents Inc. Thermoelastic composition of ethylene-1-olefin copolymer and rubber. 4,978,717, Cl. 525-195.000.

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Strong, Frank, 4,978,530, Cl. 424-413.000.

Heat and Control, Inc.: *See*—
Benson, Clark K.; and Caridis, Andrew A., 4,977,821, Cl. 99-348.000.

Heavers, Robert G.: *See*—
Scheurer, Robert S.; and Heavers, Robert G., 4,978,566, Cl. 428-157.000.

Hefner, Horst: *See*—
Schmidt, Herbert; Czich, Erhard; and Hefner, Horst, 4,977,987, Cl. 188-264.00G.

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Heinen, K. Gail: *See*—
Stierman, Roger J.; Heinen, K. Gail; Ramsey, Thomas; and Haefling, James F., 4,979,015, Cl. 357-69.000.

Heinisch, Richard V., to Lowering Systems, Inc. Luminaire having main and secondary reflector sections. 4,979,086, Cl. 362-297.000.

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Mainiero, John W.; Mainiero, Michael R.; and Heinlein, Thomas J., 4,978,943, Cl. 340-566.000.

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Kohler, Burkhard; and Heinz, Hans-Detlef, 4,978,729, Cl. 525-537.000.

Heisler, Manfred: *See*—
Haller, Ingo; Spindler, Ernst; Heisler, Manfred; and Kleine, Willi, 4,978,718, Cl. 525-239.000.

Hella KG Hueck & Co.: *See*—
Philipp-Buterowe, Wolfgang; and Kalze, Franz-Josef, 4,979,077, Cl. 362-61.000.

Hemaedics, Inc.: *See*—
Capozzi, Emil E.; and Cookston, H. Stephen, 4,978,336, Cl. 604-82.000.

Hempsted Glazing Systems Ltd.: *See*—
Hawkins, Glynn J., 4,977,716, Cl. 52-235.000.

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Hendrix, Donald E.; and Smith, Stephen F., to Martin Marietta Energy Systems, Inc. Demodulation circuit for AC motor current spectral analysis. 4,978,909, Cl. 324-77.00B.

Henk, Hermann: *See*—
Weber, Karl-Arnold; Henk, Hermann; Kunde, Klaus; Westphal, Jochen; and Wunderlich, Klaus, 4,978,747, Cl. 534-735.000.

Henkel Corporation: *See*—
Kilbarger, Alan C.; Kain, William S.; and Kinsman, Donald V., 4,978,392, Cl. 106-95.000.

Henneke, Mark Q.: *See*—
Henderson, Herman O., Jr.; and Henneke, Mark Q., 4,978,147, Cl. 285-2.000.

Henry, Charles H.: *See*—
Blonder, Greg E.; Henry, Charles H.; Kazarinov, Rudolf F.; and Wolfe, Raymond, 4,978,189, Cl. 350-96.120.

Henry, Herbert W.: *See*—
Lesher, Kenneth C.; and Henry, Herbert W., 4,978,518, Cl. 423-504.000.

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Heraeus Quarzschmelze GmbH: *See*—
Dieudonne, Walter; Mittelstadt, Norbert; and Reul, Kurt, 4,978,836, Cl. 219-388.000.

Heraeus Sepatech GmbH: *See*—
Hirsch, Christian; Schroder, Dieter; Kopowski, Eckart; and Kocher, Helmut, 4,978,153, Cl. 292-201.000.

Herbert, Edward; and Cebry, Stephen E., to FMTT, Inc. Picture frame matrix transformer. 4,978,906, Cl. 323-361.000.

Herd, Karl-Josef, to Bayer Aktiengesellschaft. Reactive naphthyl aza pyridone dyestuffs. 4,978,746, Cl. 534-632.000.

Heremans, Joseph P.: *See*—
Partin, Dale L.; Heremans, Joseph P.; and Morelli, Donald T., 4,978,938, Cl. 338-32.00R.

Herfurth GmbH: *See*—
Knobbe, Karl-Heinz, 4,978,929, Cl. 331-173.000.

Herold, Wolf-Dietrich: *See*—
Wilhelm, Klaus; Bauer, Johann; Schmitt, Werner; Herold, Wolf-Dietrich; Koran, Peter; Wanek, Erich; and Gasser, Oswald, 4,978,359, Cl. 623-23.000.

Herron, Matthew A.; and Boyle, Dennis J., to Dynabook Technologies Corporation. Locking mechanism and support legs for removable display assembly. 4,978,949, Cl. 340-711.000.

Hersh, Evan M.: *See*—
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Hertler, Walter R., to Du Pont de Nemours, E. I., and Company. Phosphonate-capped polymers. 4,978,723, Cl. 525-326.500.

Herweyer, Eleanor B.; and Herweyer, Elliott E. Hot water heating system with selective bypass. 4,977,885, Cl. 126-362.000.

Herweyer, Elliott E.: *See*—
Herweyer, Eleanor B.; and Herweyer, Elliott E., 4,977,885, Cl. 126-362.000.

Hesch, Leon D.: *See*—
Sager, David J.; Hesch, Leon D.; Ingraham, Andrew D.; and Samaras, William A., 4,979,190, Cl. 375-106.000.

Hessenthaler, George D. Multiple angle jointer and planer knives. 4,977,937, Cl. 144-241.000.

Heumann Pharma GmbH & Co.: *See*—
Grafe, Ingomar; Schickaneder, Helmut; and Ahrens, Kurt H., 4,978,773, Cl. 560-47.000.

Hewitt, Mary J.: *See*—
Morse, Arthur L.; Gaalema, Steve D.; Keimel, Ingrid M.; and Hewitt, Mary J., 4,978,872, Cl. 307-490.000.

Hewlett-Packard Company: *See*—
Asakawa, Stuart D., 4,978,979, Cl. 346-140.00R.
Bach, Valerie A., 4,978,420, Cl. 156-643.000.
Bayley, Brian J.; Brosnan, Michael J.; and Hochgraf, Neil, 4,978,860, Cl. 250-568.000.
Carp, Stuart L.; and Edwards, Allen P., 4,978,931, Cl. 333-28.00R.
Chieng, C. K., 4,978,969, Cl. 346-1.100.

Heyn, Hans E.; and Narramore, Russell H., to Exxon Chemical Patents Inc. Garment with foam cushion elastic closure. 4,978,570, Cl. 428-231.000.

Hezel, Thomas: *See*—
Vetter, Kurt; Baumann, Michael; and Hezel, Thomas, 4,977,911, Cl. 134-34.000.

HGM Medical Laser Systems, Inc.: *See*—
Bentley, Joseph R., 4,978,346, Cl. 606-27.000.

Hiben, Bradley M.: *See*—
Kotzin, Michael D.; van den Heuvel, Anthony P.; Crisler, Kenneth J.; Hiben, Bradley M.; Mohl, Lawrence M.; and Poulin, Mark R., 4,979,188, Cl. 375-34.000.

Hickman, James A. A. Method of manufacturing fire-resistant safety glass. 4,978,405, Cl. 156-107.000.

Hicks, Bradford W., to Eaton Corporation. Tridem drive axle system. 4,977,972, Cl. 180-24.040.

Hieda, Katsuhiko; Horiguchi, Fumio; and Watanabe, Hidehiro, to Kabushiki Kaisha Toshiba. MOS transistor. 4,979,014, Cl. 357-56.000.

Hifumi, Fujita, to Kabushiki Kaisha Toshiba. Indirect-plunger hydraulic elevator. 4,977,980, Cl. 187-1.00R.

Higgins, George C.: *See*—
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,978,571, Cl. 428-263.000.

Higuchi, Tatsuji: *See*—
Nakano, Toshifumi; Inoue, Akira; Kikuchi, Juro; Nakamura, Hiroaki; and Higuchi, Tatsuji, 4,978,989, Cl. 354-413.000.

Hikone, Makoto; Maeda, Kouzo; and Yoshioka, Masanobu, to Nissan Motor Co., Ltd. Vehicular safety arrangement for driver's seat. 4,978,138, Cl. 280-777.000.

Hilal, Mohamed A., to International Superconductor Corp. Flux-motion induced bolometer based on ceramic superconductive elements. 4,978,853, Cl. 250-336.200.

Hill, Francis U., to Sorrento Engineering, Inc. Method of making porous inorganic particle filled polyimide foam insulation products. 4,978,690, Cl. 521-54.000.

Hill, Hugh A. O.: *See*—
Forrest, Gordon C.; Rattle, Simon J.; Robinson, Grenville A.; and Hill, Hugh A. O., 4,978,610, Cl. 435-7.000.

Hill, James E., to Dynetics Engineering Corporation. Card counter with self-adjusting card loading assembly and method. 4,978,845, Cl. 250-222.100.

Hill, James H. Free flow fitting. 4,977,927, Cl. 137-539.000.

Hill, Todd: *See*—
Bond, David G.; Hill, Todd; Weis, Paul D.; and Woods, John R., 4,979,191, Cl. 375-108.000.

Hilti Aktiengesellschaft: *See*—
Lins, Reinhard, 4,978,258, Cl. 408-187.000.

Himes, Ronald E.; and Simon, David E., to Halliburton Company. Fluid additive and method for treatment of subterranean formations. 4,977,962, Cl. 166-305.100.

Himmelmann, Wolfgang: *See*—
Roche, Edouard; Himmelmann, Wolfgang; Buschmann, Hans-Theo; and Quambusch, Heinz, 4,978,607, Cl. 430-642.000.

Himmert, Rainer; Brand, Heinrich; Dommer, Josef; and Bock, Erich, to Diehl GmbH & Co. Guidance mechanism for a subcaliber-sized fin-stabilized practice projectile. 4,978,088, Cl. 244-3.240.

Himont Incorporated: *See*—
Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, 4,978,648, Cl. 502-127.000.

Himont Italia S.r.l.: *See*—
Chapoy, L. Lawrence; Coassolo, Alfredo; and Foa, Marco, 4,978,735, Cl. 528-193.000.

Hinks, Richard S., to Picker International, Inc. Measurement and calibration of eddy currents for magnetic resonance imagers. 4,978,919, Cl. 324-313.000.

Hinton, Harvard S.; Lentine, Anthony L.; and Miller, David A. B., to AT&T Bell Laboratories. Programmable optical logic device with complementary inputs. 4,978,842, Cl. 250-213.00A.

Hirai, Hayao, to Mitsubishi Denki Kabushiki Kaisha. Machining data forming system for numerical control device. 4,978,901, Cl. 318-600.000.

Hirai, Isamu: *See*—
Satoh, Osamu; Hirai, Isamu; and Nakata, Masahiro, 4,978,981, Cl. 354-410.000.

Hirakawa, Toshiro: *See*—
Nakamura, Hisashi; Kubo, Ken-ichi; and Hirakawa, Toshiro, 4,977,882, Cl. 123-502.000.

Hirako, Ryo: *See*—
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Hiramatsu, Teruo: *See*—
Shibuya, Kiyoshi; Sato, Toru; Morito, Nobuyuki; Nara, Seiko; and Hiramatsu, Teruo, 4,977,949, Cl. 164-417.000.

Hirano, Akihiro; and Hayashi, Seizo, to Matsushita Electric Industrial Co., Ltd. Floor nozzle for vacuum cleaner. 4,977,640, Cl. 15-339.000.

Hirano, Seiji: *See*—
Oda, Kenzo; and Hirano, Seiji, 4,978,311, Cl. 439-188.000.

Hiraoka, Tetsuo; Ohtsuka, Takenori; Hokazono, Kazuaki; Seike, Shinji; and Sunada, Tomohiro, to Mazda Motor Corporation. Intake system for V-type engine. 4,977,865, Cl. 123-52.0MB.

Hiroi, Masakazu: *See*—
Murakami, Koichi; and Hiroi, Masakazu, 4,978,045, Cl. 227-1.000.

Hirose Electric Co., Ltd.: *See*—
Yahata, Katsumi, 4,978,316, Cl. 439-449.000.

Hirsch, Christian; Schroder, Dieter; Kopowski, Eckart; and Kocher, Helmut, to Heraeus Sepatech GmbH. Latch for a laboratory apparatus. 4,978,153, Cl. 292-201.000.

Hirschberg, Joseph G.: *See*—
Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., 4,979,203, Cl. 378-206.000.

Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, to National Space Development Agency of Japan; and Mitsubishi Denki Kabushiki Kaisha. Electrically scanning microwave radiometer. 4,978,962, Cl. 342-351.000.

Hitachi Device Engineering Co., Ltd.: *See*—
Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, 4,978,886, Cl. 313-414.000.

Hitachi, Ltd.: *See—*
Hotta, Masao; Shimizu, Toshihiko; and Nejime, Yoshito, 4,978,957, Cl. 341-156.000.
Kida, Hiroyuki; Komagawa, Tooru; and Maejima, Hideo, 4,979,103, Cl. 364-200.000.
Kusano, Chushiro; Tanoue, Tomonori; and Mitani, Katsuhiko, 4,979,009, Cl. 357-34.000.
Minemura, Hiroyuki; Sato, Yoshio; Tsuboi, Nobuyoshi; Koyanagi, Hiroaki; and Ohyama, Shinji, 4,978,187, Cl. 350-96.110.
Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, 4,978,886, Cl. 313-414.000.
Shimizu, Ryuichi; Kawanishi, Tsuneaki; Suzuki, Shigeo; Hosaka, Shigeo; Mori, Yasuki; and Narahara, Toshikazu, 4,978,596, Cl. 430-109.000.
Shindo, Isao; Tao, Ryuji; and Ozawa, Kyoichi, 4,977,776, Cl. 73-1.00G.
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.
Ueda, Hirotada; Kato, Kanji; and Matsushima, Hitoshi, 4,979,096, Cl. 364-200.000.

Hitachi Medical Corporation: *See—*
Nishimura, Hiroshi, 4,979,111, Cl. 364-413.160.

Hitachi Metals, Ltd.: *See—*
Iwasaki, Katsunori; Tanigawa, Shigeho; and Tokunaga, Masaaki, 4,978,398, Cl. 148-101.000.

Hiwatashi, Yutaka; Kamimura, Katsuyoshi; and Mine, Atsushi, to Fuji Jukogyo Kabushiki Kaisha. Suspension control system for a motor vehicle. 4,978,848, Cl. 250-231.160.

Hochgraf, Neil: *See—*
Bayley, Brian J.; Brosnan, Michael J.; and Hochgraf, Neil, 4,978,860, Cl. 250-568.000.

Hochtief Aktiengesellschaft Vorm. Gebr.Helfmann: *See—*
Krumbach, Guido, 4,977,715, Cl. 52-223.00R.

Hocking, Gary A., to Stockham Valve Australia Pty. Ltd. Check valve. 4,977,926, Cl. 137-512.100.

Hoechst Aktiengesellschaft: *See—*
Fuchs, Karlheinz; and Munch, Norbert, 4,978,361, Cl. 8-94.270.
Lau, Jurgen; and Siegemund, Gunter, 4,978,790, Cl. 564-315.000.
Reske, Eckart; and Wolters, Ernst, 4,978,725, Cl. 525-399.000.
Schlegel, Gunter; and Mildenberger, Hilmar, 4,978,774, Cl. 560-53.000.

Hoechst Celanese Corp.: *See—*
Allen, Diane E.; and DeMartino, Ronald N., 4,978,476, Cl. 252-299.010.
Johnson, Robert E., 4,978,515, Cl. 423-263.000.
Khanna, Dinesh N., 4,978,733, Cl. 528-170.000.
Khanna, Dinesh N., 4,978,734, Cl. 528-184.000.
Kohn, Rachel S., 4,978,573, Cl. 428-333.000.
Mueller, Werner H.; Vora, Rohitkumar H.; and Khanna, Dinesh N., 4,978,738, Cl. 528-220.000.
Vora, Rohitkumar H., 4,978,737, Cl. 528-220.000.
Vora, Rohitkumar H.; and Mueller, Werner H., 4,978,742, Cl. 528-353.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See—*
Effland, Richard C.; and Fink, David M., 4,978,663, Cl. 514-231.800.
Shutske, Gregory M., 4,978,678, Cl. 514-455.000.

Hoesch Stahl AG: *See—*
Stamm, Klaus; and Tenhaven, Ulrich, 4,978,582, Cl. 428-551.000.

Hoff, David; and Pathak, Saroj, to Cypress Semiconductor Corp. Noise reduction output buffer. 4,978,905, Cl. 323-314.000.

Hoffman, Dennis, Sr., to Pro Patch Systems, Inc. Bent position retention flexible corner bead strip. 4,977,718, Cl. 52-288.000.

Hoffman, Jerzy; and Ciezarek, Krzysztof J. Electromagnetic relay. 4,978,935, Cl. 335-121.000.

Hoffrel Instruments, Inc.: *See—*
Schwarzschild, Jack; Uphoff, Russel L.; and Miller, Christopher G., 4,977,898, Cl. 128-662.060.

Hofmann, John E.; Sun, William H.; and Luftglass, Bryan K., to Fuel Tech, Inc. Combined catalytic/non-catalytic process for nitrogen oxides reduction. 4,978,514, Cl. 423-235.000.

Hogg, Howard, to Cole's Quality Foods, Inc. Collapsible display rack. 4,978,013, Cl. 211-181.000.

Hokazono, Kazuaki: *See—*
Hiraoka, Tetsuo; Ohtsuka, Takenori; Hokazono, Kazuaki; Seike, Shinji; and Sunada, Tomohiro, 4,977,865, Cl. 123-52.0MB.

Holbrook, Russell W., to Pitney Bowes Inc. Reverse belt singulating apparatus. 4,978,114, Cl. 271-35.000.

Holleman, Colleen; and Holleman, Gregg. Board game. 4,978,128, Cl. 273-248.000.

Holleman, Gregg: *See—*
Holleman, Colleen; and Holleman, Gregg, 4,978,128, Cl. 273-248.000.

Holliday, Craig S.; and Holliday, Deborah A. Reusable multi-layered diaper. 4,978,345, Cl. 604-384.000.

Holliday, Deborah A.: *See—*
Holliday, Craig S.; and Holliday, Deborah A., 4,978,345, Cl. 604-384.000.

Holschuh, Mark T., to Tecumseh Products Company. Mechanical compression release system. 4,977,868, Cl. 123-182.000.

Holtey, Thomas O.; Murray, Thomas L., Jr.; Perzan, Wayne A.; and Smith, Scott W., to Bull HN Information Systems Inc. Dual microprocessor control system. 4,979,104, Cl. 364-200.000.

Homayoun, Habib: *See—*
Digby, Dennis; and Homayoun, Habib, 4,977,899, Cl. 128-702.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Aihara, Yasuyuki; Baba, Shigeki; Shimizu, Chiharu; and Akiyama, Eitetsu, 4,977,743, Cl. 60-605.300.
Aihara, Yasuyuki; Katoh, Shuji; Baba, Shigeki; and Akiyama, Eitetsu, 4,977,862, Cl. 123-41.120.
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 4,977,797, Cl. 74-866.000.
Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, 4,977,989, Cl. 192-56.00R.
Nakamura, Akihisa; and Okamoto, Hideo, 4,978,850, Cl. 250-227.110.
Takano, Osamu; Kawakami, Hiroshi; and Yakuwa, Masahiko, 4,979,143, Cl. 364-900.000.

Honda, Hiroyuki, to Konica Corporation. Interlock switch for a copying apparatus. 4,978,817, Cl. 200-50.00A.

Honda, Kazuo: *See—*
Matsuura, Atsushi; Honda, Kazuo; Inukai, Shinji; and Sano, Hisanori, 4,978,887, Cl. 313-635.000.

Honda, Toshio: *See—*
Tsujiuchi, Junpei; Ikeda, Shigeto; Honda, Toshio; Ohyama, Nagaaki; and Kikuchi, Susumu, 4,979,225, Cl. 382-17.000.

Honeywell Inc.: *See—*
Brownell, David J., 4,979,012, Cl. 357-40.000.

Hong, Sung-Pyo, to Samsung Electronics Co., Ltd. Automatic contrast circuit for instantaneous compensation. 4,979,044, Cl. 358-168.000.

Honma, Shiro: *See—*
Tanaka, Mutsuhiro; and Honma, Shiro, 4,978,707, Cl. 524-504.000.

Honour, Andrew M., to Thorn EMI plc. Electrical device including an electrical connector. 4,978,814, Cl. 174-130.00R.

Hoogewijs, Robert: *See—*
Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, 4,978,586, Cl. 428-625.000.

Hopfer, Roy L.: *See—*
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Hoppe, Richard J.: *See—*
Huss, John; Hoppe, Richard J.; Crowe, Lawrence E.; Sutrina, Thomas; and Lakin, Eric D., 4,979,090, Cl. 363-141.000.

Horiguchi, Fumio: *See—*
Hieda, Katsuhiko; Horiguchi, Fumio; and Watanabe, Hidehiro, 4,979,014, Cl. 357-56.000.

Horikawa, Kazuo, to Fuji Photo Film Co., Ltd. Beam-combining laser beam source device. 4,978,197, Cl. 350-174.000.

Horlogerie Photographique Francaise Societe Anonyme: *See—*
Causse, Pierre; Graham, Peter; Maury, Bernard; and Walter, Jean-Claude, 4,978,880, Cl. 310-324.000.

Hornbuckle, Charles R.: *See—*
Hacker, George G.; Turner, James K.; and Hornbuckle, Charles R., 4,977,761, Cl. 68-177.000.

Horsthemke, August: *See—*
Selbeck, Harald; Horsthemke, August; Bockmann, August; and Weber, Frank, 4,978,743, Cl. 528-499.000.

Hosaka, Shigeo: *See—*
Shimizu, Ryuichi; Kawanishi, Tsuneaki; Suzuki, Shigeo; Hosaka, Shigeo; Mori, Yasuki; and Narahara, Toshikazu, 4,978,596, Cl. 430-109.000.

Hosel, Fritz, to Trutzschler GmbH & Co. KG. Apparatus for removing foreign metal bodies from a fiber transporting duct. 4,977,645, Cl. 19-200.000.

Hoshino, Eiichi: *See—*
Suzuki, Akira; Ito, Susumu; Okamoto, Kikuhiko; Hoshino, Eiichi; Yokosuka, Michio; and Murata, Moriyasu, 4,978,470, Cl. 252-174.120.

Hoshino, Futoshi; Nakano, Makoto; and Yanagihara, Takeshi, to Mitsui Toatsu Chemicals, Incorporated. Fine-particle aggregate emulsion and process for producing same. 4,978,695, Cl. 523-201.000.

Hosiden Electronics Co., Ltd.: *See—*
Shichida, Akihito, 4,978,310, Cl. 439-188.000.

Hosoda, Kenji; Suzuki, Hideaki; Kubota, Takaharu; and Nawata, Kiyoshi, to Teijin Limited. Reagents for measurement of immune complexes and method for measurement of immune complexes by use thereof. 4,978,611, Cl. 435-7.000.

Hotta, Masao; Shimizu, Toshihiko; and Nejime, Yoshito, to Hitachi, Ltd. High-speed analog-to-digital converter. 4,978,957, Cl. 341-156.000.

Hotz, Peter: *See—*
Schmidt, Gregory R.; and Hotz, Peter, 4,977,879, Cl. 123-376.000.

Howa Machinery, Ltd.: *See—*
Yamada, Koichi; Enomoto, Hiroshi; and Yoshida, Osamu, 4,977,737, Cl. 57-97.000.

Howell, Jones V., to Archive Corporation. Data randomizing/de-randomizing circuit for randomizing and de-randomizing data. 4,978,955, Cl. 341-109.000.

Hoynant, George: *See—*
Dumas, Daniel; and Hoynant, George, 4,978,496, Cl. 376-280.000.

Hsieh, Wu H. Means for regulating cymbal pedal tautness. 4,977,810, Cl. 84-422.300.

Hsieh, Yih-Trong: *See—*
Li, Hsun-Feng; and Hsieh, Yih-Trong, 4,979,130, Cl. 364-518.000.

Hsu, Tsung-Yuan; Wu, Shin-Tson; and Loo, Robert Y., to Hughes Aircraft Company. Photoelectronic diode spatial light modulator and

eye protection goggles incorporating the same. 4,978,208, Cl. 351-45.000.

Hua, Chang-Hwang; Chan, Simon S.; Day, Ding-Yuan S.; and Lee, Adrian C., to Avantek, Inc. Method for the simultaneous formation of via-holes and wraparound plating on semiconductor chips. 4,978,639, Cl. 437-230.000.

Hubbard, Larry M., Jr. Carburetor idler assist system. 4,977,878, Cl. 123-339.000.

Huber, Helmuth: *See*—
Munk, Edmund; and Huber, Helmuth, 4,977,930, Cl. 138-89.000.

Huck Manufacturing Company: *See*—
Hurd, Ramon L., 4,977,663, Cl. 29-525.200.

Hudis, Scott: *See*—
Pruden, Benny J.; Wisnik, Howard; and Hudis, Scott, 4,979,208, Cl. 379-145.000.

Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., to Iowa State University Research Foundation, Inc. Apparatus and process for separating bone fragments, gristle and sinews from meat as the meat is being ground. 4,978,077, Cl. 241-30.000.

Huggins, Orville C., to Monarch Marking Systems, Inc. Printing apparatus with finger-engageable recess providing a carrying handle. 4,977,829, Cl. 101-292.000.

Hughes Aircraft Company: *See*—
Hsu, Tsung-Yuan; Wu, Shin-Tson; and Loo, Robert Y., 4,978,208, Cl. 351-45.000.
Morse, Arthur L.; Gaalema, Steve D.; Keimel, Ingrid M.; and Hewitt, Mary J., 4,978,872, Cl. 307-490.000.
Schotter, Daniel K., 4,978,413, Cl. 156-446.000.
Schumacher, Robert W., 4,978,889, Cl. 315-111.210.
Williams, Fred C., deceased; and Williams, Dorothy, executor, 4,978,961, Cl. 342-25.000.
Yin, Khin S.; Virgadamo, Michael J.; Tanaka, David D.; and Banuelos, Angel F., 4,978,593, Cl. 430-2.000.

Hughes, John T., to Zortech International Limited. Method and apparatus for testing thermal conductivity. 4,978,229, Cl. 374-30.000.

Hulek, Anton; Koller, Werner; and Auer, Kurt, to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H.; and Hulek, Anton, a part interest. Apparatus for producing foamed blast furnace slag. 4,978,107, Cl. 266-201.000.

Hull, Martin P. Exercising device for simulating athletic movements. 4,978,119, Cl. 272-71.000.

Humitz, John N.; Potter, Robert W.; and Kostrzewa, Kenneth J., to Chrysler Corporation. Rail car shipping rack having yielding rack extension members. 4,978,014, Cl. 211-195.000.

Hundeby, David R.: *See*—
Friggstad, Terrance; and Hundeby, David R., 4,977,964, Cl. 172-310.000.

Hunt, Gary D.: *See*—
Reid, Laurie M.; and Hunt, Gary D., 4,978,275, Cl. 414-789.500.

Hunt, James R., to Surgical Specialties, Inc. Surgical hip wrap. 4,977,893, Cl. 128-157.000.

Hunter-melnor, Inc.: *See*—
Chow, Ho, 4,978,070, Cl. 239-230.000.

Hurd, Ramon L., to Huck Manufacturing Company. Method for securing workpieces of composite materials. 4,977,663, Cl. 29-525.200.

Hurley, Francis X., to United States of America, Army. Variable cycle engine passive mechanism. 4,978,286, Cl. 416-89.000.

Hurtubis, Edward F.: *See*—
Lioy, Daniel C.; Hurtubis, Edward F.; and Schickler, Edward R., 4,977,656, Cl. 29-121.800.

Hurwitz, Robert. Amniocentesis needle with improved sonographic visibility. 4,977,897, Cl. 128-662.050.

Huss, John; Hoppe, Richard J.; Crowe, Lawrence E.; Sutrina, Thomas; and Lakin, Eric D., to Sundstrand Corporation. Power converter circuit board. 4,979,090, Cl. 363-141.000.

Husted, Martin D., to International Electrical Research Corp. Low friction insertion structure and method of making. 4,979,073, Cl. 361-386.000.

Husted, Royce H. Plastic stabilized composite camshaft. 4,977,793, Cl. 74-567.000.

Hutchinson: *See*—
Potier, Miehel; and Briet, Gilles, 4,977,954, Cl. 165-76.000.

Hydra Tech, Inc.: *See*—
Hensler, David L., 4,978,243, Cl. 403-24.000.

I.E.M.C.A. SpA Industria Elettromeccanica Complessi Automatici: *See*—
Fabbri, Vladimiro, 4,977,801, Cl. 82-127.000.

Iacoponi, Michael J.: *See*—
Seefeldt, David F.; Iacoponi, Michael J.; and Vail, David K., Jr., 4,978,633, Cl. 437-51.000.

Iacovangelo, Charles D., to General Electric Company. Autocatalytic electroless gold plating composition. 4,978,559, Cl. 427-304.000.

Ibi, Akira; Kitagawa, Masanori; Sagawa, Eiichi; Takeuchi, Koichi; and Ohkawado, Etsuo, to Mitsui Toatsu Chemicals, Incorporated. Preparation process of unsaturated carboxylic acid amide. 4,978,754, Cl. 544-176.000.

Ichihara, Yukio: *See*—
Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; Ichihara, Yukio; and Sasaki, Toshio, 4,977,842, Cl. 112-199.000.

Ichikawa, Shuji: *See*—
Kanayama, Kaoru; and Ichikawa, Shuji, 4,978,810, Cl. 568-720.000.

Ichinoi, Yutaka, to Victor Company of Japan, Ltd. Carrier chrominance signal processing circuit. 4,979,025, Cl. 358-40.000.

ICI Americas Inc.: *See*—
Lawson, John R., 4,978,756, Cl. 548-171.000.

Ida, Kazuo, to Yoshida Kogyo K. K. Buckle assembly. 4,977,650, Cl. 24-614.000.

Ida, Masakatsu; and Morishita, Arkira, to Mitsubishi Denki Kabushiki Kaisha. Moisture drain arrangement for a vertical shaft engine starter. 4,978,864, Cl. 290-48.000.

Idemitsu Kosan Company Limited: *See*—
Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, 4,978,730, Cl. 526-153.000.

Idemitsu Petrochemical Co., Ltd.: *See*—
Takashige, Masao; Iwai, Teruyuki; Takeichi, Hidenobu; Takai, Yasuo; Sasaki, Yoshinori; Masuoka, Masato; and Ohki, Yuichi, 4,978,484, Cl. 264-40.100.

Iguchi, Norihisa: *See*—
Yasui, Yasuyoshi; and Iguchi, Norihisa, 4,978,329, Cl. 475-84.000.

Iguichi, Yoshihiro: *See*—
Kanno, Tatsuya; Takahashi, Ikuo; Sasaki, Kenichi; Iguichi, Yoshihiro; and Fukuda, Yutaka, 4,978,578, Cl. 428-412.000.

Ikebe, Masaru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, to TDK Corporation. Disc cartridge having a liner and an elastic member for maintaining the liner in contact with a disc. 4,979,065, Cl. 360-133.000.

Ikeda Bussan Co., Ltd.: *See*—
Tateyama, Tomoyoshi, 4,978,171, Cl. 297-417.000.

Ikeda, Hiroyuki: *See*—
Ito, Takaaki; Uchida, Akio; and Ikeda, Hiroyuki, 4,979,071, Cl. 361-56.000.

Ikeda, Shigeto: *See*—
Tsujiuchi, Junpei; Ikeda, Shigeto; Honda, Toshio; Ohyama, Nagaaki; and Kikuchi, Susumu, 4,979,225, Cl. 382-17.000.

Ikegami, Shiro; Torizawa, Yasuhiro; and Kurozumi, Seizi, to Teijin Limited. Process for producing bicyclo[3.3.0]octanes. 4,978,775, Cl. 560-119.000.

Ikuta, Hironori: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Ilizarov, Gavriil A. Compression-distraction apparatus for osteosynthesis. 4,978,348, Cl. 606-57.000.

Ilizarov, Gavrill A. Distraction apparatus for osteosynthesis of short tubular bones. 4,978,347, Cl. 606-54.000.

Illinois Tool Works, Inc.: *See*—
Foley, Raymond J., 4,979,067, Cl. 361-18.000.

Il Yoo, Kim, to Permanent Solution Industries, Inc. Plastic air filter housing assembly for use in air conditioners and heating systems. 4,978,375, Cl. 55-493.000.

Imai, Minoru: *See*—
Yoshihiro, Yoshiro; Adachi, Masahiro; and Imai, Minoru, 4,978,498, Cl. 419-37.000.

Imai, Tomohisa: *See*—
Takahashi, Yutaka; Noguchi, Yoshihiro; Yanagida, Takahiro; and Imai, Tomohisa, 4,977,639, Cl. 15-319.000.

Imatani, Toshio: *See*—
Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, 4,978,962, Cl. 342-351.000.

Imokawa, Genji: *See*—
Motegi, Itsuro; Kawai, Michio; Imokawa, Genji; Nakamura, Koichi; and Takaishi, Naotake, 4,978,523, Cl. 424-59.000.

Imperial Chemical Industries PLC: *See*—
Carnell, Peter J. H.; and Denny, Patrick J., 4,978,439, Cl. 208-91.000.
Dalton, Raymond F.; and Leng, John L., 4,978,788, Cl. 564-265.000.

Ina Lineartechnik Ohg: *See*—
Stotzel, Gilbert; Fuhrmann, Jorg; and Schneider, Joachim, 4,978,233, Cl. 384-12.000.

Inaga, Hisashi: *See*—
Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi, 4,977,875, Cl. 123-299.000.

Inagaki, Jiroh: *See*—
Yagi, Nobuyuki; Inagaki, Jiroh; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,978,491, Cl. 264-154.000.

Inagaki, Jitsuo; and Sawata, Hisako. Method of purifying water for drink with solar light and heat and apparatus used for the same method. 4,978,458, Cl. 210-748.000.

Inage, Toyoshi; and Ito, Kiyoshi, to Sumitomo Heavy Industries, Ltd. Lithographic plate fastening apparatus of printing press. 4,977,833, Cl. 101-415.100.

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Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, 4,978,962, Cl. 342-351.000.

Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, to Kajima Corp.; Tachikawa Corp.; and Teijin Chemicals Ltd. Sunshade. 4,978,181, Cl. 350-1.700.

Indig, Maurice E.; and King, Laura L. H., to General Electric Company. Electrode probe for use in aqueous environments of high temperature and high radiation. 4,978,921, Cl. 324-446.000.

Industrial Technology Research Institute: *See*—
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Information Technologies Research Inc.: *See*—
Kisor, Gregory H.; Parker, James F.; and King, Edward J., 4,979,039, Cl. 358-133.000.
Ingraham, Andrew D.: *See*—
Sager, David J.; Hesch, Leon D.; Ingraham, Andrew D.; and Samaras, William A., 4,979,190, Cl. 375-106.000.
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Carobbi, Renato; and Innocenti, Franco, 4,978,397, Cl. 127-46.200.
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Inolex Chemical Company: *See*—
Gesslein, Bruce W.; Guth, Jacob J.; Mintz, Gilbert R.; Reinhart, Gale M.; and Smith, Laurence R., 4,978,526, Cl. 424-70.000.
Inoue, Akira: *See*—
Nakano, Toshifumi; Inoue, Akira; Kikuchi, Juro; Nakamura, Hiroaki; and Higuchi, Tatsuji, 4,978,989, Cl. 354-413.000.
Inoue, Manabu: *See*—
Ishikawa, Norio; Nakai, Masaaki; and Inoue, Manabu, 4,978,982, Cl. 354-21.000.
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Rialan, Joseph; and Thierry, Gerard, 4,979,152, Cl. 367-77.000.
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Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, 4,978,749, Cl. 536-27.000.
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Intermagnetics General Corporation: *See*—
Markiewicz, W. Denis; Ciancetta, Gary; and Jonas, Philip, 4,978,936, Cl. 335-216.000.
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Daly, James C.; Nick, Jeffrey M.; and Rodegeb, Franklin J., 4,979,105, Cl. 364-200.000.
International Business Machines Corporation: *See*—
Advani, Hira; and Terrell, William L., 4,979,107, Cl. 364-200.000.
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Fukunaga, Seiji; Nakamura, Takashi; and Ono, Hiroyuki, 4,978,847, Cl. 250-231.140.
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Interstate Medical Marketing, Inc.: *See*—
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Intra-Sonix, Inc.: *See*—
Martinelli, Michael A., 4,977,655, Cl. 29-25.350.
Inubushi, Hisao; Yoshihara, Tetsuya; and Sakamoto, Mioshi, to NKK Corporation; Nippon Rotary Nozzle Co., Ltd.; Kokan Kikai Kogyo Kabushiki Kaisha; and Tokyo Yogyo Kabushiki Kaisha. Rotary nozzles. 4,978,040, Cl. 222-598.000.
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Komeda, Kenichiro; and Inui, Kenichi, 4,978,129, Cl. 273-237.000.
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Ishikawa, Noriyoshi; Inui, Toshiharu; Tamura, Yasuyuki; and Harada, Toshiaki, 4,978,968, Cl. 346-1.100.
Inujima, Takashi: *See*—
Yamazaki, Shunpei; Inujima, Takashi; Hamatani, Toshiji; Konuma, Toshimitsu; Sakama, Mitsunori; Kobayashi, Ippei; and Yamaguchi, Toshiharu, 4,978,203, Cl. 350-339.00R.
Inukai, Shinji: *See*—
Matsuura, Atsushi; Honda, Kazuo; Inukai, Shinji; and Sano, Hisanori, 4,978,887, Cl. 313-635.000.
Inventio: *See*—
Arnosti, Hansjorg; and Bussmann, Hans, 4,977,984, Cl. 187-134.000.
Iowa State University Research Foundation, Inc.: *See*—
Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., 4,978,077, Cl. 241-30.000.
Irvine, Duncan A.: *See*—
Gemmell, David; and Irvine, Duncan A., 4,979,094, Cl. 364-188.000.
Irving, Edward: *See*—
Banks, Christopher P.; and Irving, Edward, 4,978,604, Cl. 430-327.000.
Irwin, Dean S., to Collimated Displays Incorporated. Flat screen color video display. 4,978,952, Cl. 340-795.000.
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Ishimori, Shoso; and Ishida, Mikio, 4,977,760, Cl. 60-444.000.
Ishida, Tokuji: *See*—
Taniguchi, Nobuyuki; Karasaki, Toshihiko; Ishida, Tokuji; Hamada, Masataka; and Norita, Toshio, 4,979,045, Cl. 358-227.000.
Ishihara, Koichiro: *See*—
Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara, Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, 4,977,902, Cl. 128-804.000.
Ishihara, Masaki: *See*—
Hattori, Toshihiro; Ishihara, Masaki; Kasai, Hitoshi; and Moride, Shigeki, 4,979,117, Cl. 364-431.070.
Ishii, Hidehiro: *See*—
Shimada, Naoki; Ishii, Hidehiro; Sato, Masuhiro; and Shinohara, Masayori, 4,979,048, Cl. 358-342.000.
Ishii, Masayuki: *See*—
Takase, Shinichi; and Ishii, Masayuki, 4,979,089, Cl. 363-132.000.
Ishii, Toshiyuki: *See*—
Ito, Michiyasu; Ishii, Toshiyuki; Matumura, Shuji; Mushika, Hajime; and Tanaka, Tomohide, 4,978,486, Cl. 264-41.000.
Ishii, Yoshiki: *See*—
Aoki, Akio; and Ishii, Yoshiki, 4,979,187, Cl. 375-27.000.
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Mori, Sanae; Sakamoto, Masaaki; Wada, Motomu; and Ishikawa, Hideo, 4,978,587, Cl. 428-645.000.
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Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, 4,978,588, Cl. 204-192.310.
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Akeyoshi, Kazuyuki; Matsumoto, Takeshi; Harada, Satoru; Nakamura, Masatake; and Ishikawa, Toshiyuki, 4,978,812, Cl. 174-35.0MS.
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Hattori, Toshihiro; Ishihara, Masaki; Kasai, Hitoshi; and Moride, Shigeki, 4,979,117, Cl. 364-431.070.
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Hamada, Jun-ichi; Itaya, Masahiko; and Motohashi, Mitsuo, 4,979,000, Cl. 355-315.000.
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Isshiki, Tomiya; Kijima, Yasuhiko; Ito, Akiro; Miyauchi, Yuh; Konko, Takao; and Watanabe, Takayuki, 4,978,778, Cl. 560-261.000.
Ito, Junichi: *See*—
Saito, Takahiro; and Ito, Junichi, 4,977,679, Cl. 33-316.000.
Ito, Kiyoshi: *See*—
Inage, Toyoshi; and Ito, Kiyoshi, 4,977,833, Cl. 101-415.100.
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Suzuki, Akira; Ito, Susumu; Okamoto, Kikuhiko; Hoshino, Eiichi; Yokosuka, Michio; and Murata, Moriyasu, 4,978,470, Cl. 252-174.120.
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Yamasaki, Masafumi; Toyofuku, Toshiyuki; Itoh, Junichi; and Kodama, Shinichi, 4,978,990, Cl. 354-432.000.
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Okubo, Hiromi; Itoh, Takanori; and Murai, Kazuo, 4,979,129, Cl. 364-518.000.
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Ohtani, Yasuaki; Kubo, Isamu; Ohtake, Kohji; and Hayashi, Kazuo, 4,978,414, Cl. 156-494.000.
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Iveco Fiat S.p.A.: *See*—
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Iwahashi, Hiroshi: *See*—
Yokoyama, Sadayuki; Asano, Masamichi; Iwahashi, Hiroshi; and Nakagawa, Kaoru, 4,979,146, Cl. 365-185.000.
Iwai, Takayoshi: *See*—
Awano, Hiroshi; Kawabata, Yuka; and Iwai, Takayoshi, 4,977,658, Cl. 29-25.010.
Iwai, Teruyuki: *See*—
Takashige, Masao; Iwai, Teruyuki; Takeichi, Hidenobu; Takai, Yasuo; Sasaki, Yoshinori; Masuoka, Masato; and Ohki, Yuichi, 4,978,484, Cl. 264-40.100.
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Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,978,898, Cl. 318-280.000.
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Ohtani, Yasuaki; Kubo, Isamu; Ohtake, Kohji; and Hayashi, Kazuo, 4,978,414, Cl. 156-494.000.
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Takano, Koshi; and Suda, Kazuya, 4,978,195, Cl. 350-96.270.
Iwatsubo, Masahito: *See*—
Hatagami, Toshifumi; Iwatsubo, Masahito; and Shinohara, Tooru, 4,978,902, Cl. 318-608.000.
Iyer, Natraj C.: *See*—
Eiffler, Elmer E.; Iyer, Natraj C.; Male, Alan T.; and Boes, David J., 4,978,487, Cl. 264-60.000.
Jabbari, Iraj: *See*—
Ghose, Sanjoy; Battu, Ramgopal; and Jabbari, Iraj, 4,979,063, Cl. 360-106.000.
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Dohler, Hardi; Jachmann, Jurgen; Weitemeyer, Christian; and Wewers, Dietmar, 4,978,726, Cl. 525-479.000.
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Chen, Robert K. T.; Jackson, Winslow E.; and Kim, Paul H. K., 4,978,839, Cl. 235-375.000.
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Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, 4,978,763, Cl. 556-50.000.
Jammes Industrie S.A.: *See*—
Gravier, Michel, 4,977,770, Cl. 72-175.000.
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Jeol Technics Co.: *See*—
Akado, Seishi, 4,978,856, Cl. 250-310.000.
Jewett, Bryce D., Jr., executor: *See*—
Jewett, Bryce D., Sr., deceased, 4,977,675, Cl. 33-028.000.
Jewett, Bryce D., Sr., deceased (by Jewett, Bryce D., Jr., executor), to Rxtec, Incoporated. Apparatus for marking eyeglass lens blanks. 4,977,675, Cl. 33-028.000.
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Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,978,898, Cl. 318-280.000.
Jiles, Stephen L. Bore Gauge. 4,977,681, Cl. 33-544.500.
Jimbo, Takamasa: *See*—
Akimoto, Mitsuru; Jimbo, Takamasa; Umemura, Kiyoshi; Iwase, Haruhiko; and Ogawa, Kenzirou, 4,978,914, Cl. 324-158.00F.
Jimelco, Inc.: *See*—
Priest, Richard J.; and Priest, Richard J., Jr., 4,977,665, Cl. 29-564.300.
Jinguji, Kaname: *See*—
Kawachi, Masao; Takato, Norio; Jinguji, Kaname; Sugita, Akio; and Sumida, Shin, 4,978,188, Cl. 350-96.120.
Johansson, Gert A. Display rack. 4,977,696, Cl. 40-605.000.
Johansson, Leif: *See*—
Larsson, Jan-Åke; and Johansson, Leif, 4,978,554, Cl. 426-604.000.
John D. Brush & Co., Inc.: *See*—
Beattie, Patrick J.; Oliveri, Andrew L.; and Sylvester, Richard J., 4,977,766, Cl. 70-326.000.
John Waddington plc: *See*—
Jones, Richard H., 4,978,415, Cl. 156-517.000.
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Johnson, Ralph K.: *See*—
Beller, Jeffrey A.; Johnson, Ralph K.; Kammerer, Roger; Kaya, Azmi; and Keyes, Marion A., IV, 4,978,425, Cl. 162-49.000.
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Noiles, Douglas G., 4,978,356, Cl. 623-18.000.
Jonas, Philip: *See*—
Markiewicz, W. Denis; Ciancetta, Gary; and Jonas, Philip, 4,978,936, Cl. 335-216.000.
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Rumbaugh, Scott H.; Jones, Michael D.; and Bos, Philip J., 4,979,235, Cl. 455-616.000.
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Joss Company: *See*—
Brais, Joseph E., 4,977,933, Cl. 139-459.000.
Jouin, Patrick; Nisato, Dino; and Castro, Bertrand, to Sanofi, S.A. and Institut National de la Sante et de la Recherche Medicale. Process for the stereospecific synthesis of optically pure 4-amino-3-hydroxycarboxylic acid derivatives. 4,978,759, Cl. 548-497.000.
Joulia, Gerard: *See*—
Morane, Bruno; and Joulia, Gerard, 4,978,035, Cl. 222-108.000.

Ju, Shiaw: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,978,720, Cl. 525-288.000.

Juel, Charles H., Jr. Selectively contourable putting green. 4,978,127, Cl. 273-176.00H.

Juengel, Richard O., to GTE Valenite Corporation. Optical data system having flash/receiver head for energizing/receiving information from a battery operated transmitter. 4,978,857, Cl. 250-551.000.

Jujo Paper Co., Ltd.: *See*—
Miyabe, Noriji, 4,977,943, Cl. 162-4.000.

Juliano, Rudolph L.: *See*—
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Juneau, Paul W., Jr.; and Semon, Howard, to General Sciences, Inc. Synergistic composite pyrotechnic material. 4,978,400, Cl. 149-21.000.

Juteau, Olivier D., to Moore Business Forms, Inc. Portable register box. 4,978,006, Cl. 206-449.000.

Jyohoku Seiko Co., Ltd.: *See*—
Maejima, Mokichi, 4,978,289, Cl. 425-141.000.

Kaack, Hermann: *See*—
Kim, Bongsub; and Kaack, Hermann, 4,978,797, Cl. 568-315.000.

Kabelitz, Hans-Peter; Kaiser, Winfried; and Stueber, Hans-Guenter, to Leybold Aktiengesellschaft. Pump stage for a high-vacuum pump. 4,978,276, Cl. 415-55.300.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Asari, Akira; Kanda, Kuniaki; Okamoto, Hiroshi; and Ueda, Masakazu, 4,977,774, Cl. 72-456.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Nishi, Yozo; and Takagi, Hiroaki, 4,977,790, Cl. 74-479.000.

Kabushiki Kaisha Ohsawa Engineering: *See*—
Ohsawa, Sueo, 4,978,053, Cl. 228-149.000.

Kabushiki Kaisha Sanyo Danki Seisakusho: *See*—
Adachi, Masaharu; Uematsu, Yoshiaki; Nagano, Haruo; and Yamada, Koji, 4,977,994, Cl. 194-210.000.

Kabushiki Kaisha Toshiba: *See*—
Anegawa, Takao, 4,978,840, Cl. 235-492.000.
Awano, Hiroshi; Kawabata, Yuka; and Iwai, Takayoshi, 4,977,658, Cl. 29-25.010.
Gouda, Kazuhiko, 4,977,887, Cl. 128-4.000.
Hieda, Katsuhiko; Horiguchi, Fumio; and Watanabe, Hidehiro, 4,979,014, Cl. 357-56.000.
Hifumi, Fujita, 4,977,980, Cl. 187-1.00R.
Kawano, Mitsumo, 4,979,194, Cl. 377-55.000.
Kusunoki, Masahiro, 4,979,053, Cl. 360-46.000.
Machida, Kaoru; Kikuchi, Yusichi; Takano, Masayuki; and Kobayashi, Noriyoshi, 4,977,780, Cl. 73-644.000.
Murase, Kazuyuki; and Tasaka, Naoyasu, 4,979,172, Cl. 371-16.100.
Nitta, Tsuneo, 4,979,213, Cl. 381-43.000.
Takahara, Eimei, 4,978,894, Cl. 318-768.000.
Tanaka, Shigeru, 4,979,018, Cl. 357-71.000.
Tokutsu, Akihito, 4,978,116, Cl. 271-291.000.
Ushiki, Hiroshi, 4,979,147, Cl. 365-189.040.
Yamagishi, Katsuaki; Kashima, Koji; Mitani, Akio; and Shimura, Masatoshi, 4,977,953, Cl. 165-10.000.
Yokoyama, Sadayuki; Asano, Masamichi; Iwahashi, Hiroshi; and Nakagawa, Kaoru, 4,979,146, Cl. 365-185.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Ukyo, Yoshio; Wada, Shigetaka; and Takatori, Kazumasa, 4,978,645, Cl. 501-98.000.

Kagechika, Hiroshi: *See*—
Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, 4,978,588, Cl. 204-192.310.

Kai, Hisao; and Nakashima, Kiyoshi, to Asahi Chemical Polyflex Ltd. Slit imparting device for forming through cuts in a plastic film. 4,977,807, Cl. 83-676.000.

Kain, William S.: *See*—
Kilbarger, Alan C.; Kain, William S.; and Kinsman, Donald V., 4,978,392, Cl. 106-95.000.

Kaiser Optical Systems: *See*—
Tedesco, James M., 4,978,182, Cl. 350-3.700.

Kaiser, Winfried: *See*—
Kabelitz, Hans-Peter; Kaiser, Winfried; and Stueber, Hans-Guenter, 4,978,276, Cl. 415-55.300.

Kajima Corp.: *See*—
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Kajiwara, Shigeru; Maeda, Hidekatsu; and Suzuki, Hideo, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Enzyme immobilization by entrapment in a polymer gel matrix. 4,978,619, Cl. 435-182.000.

Kaku, Yasutoshi: *See*—
Yagi, Nobuyuki; Inagaki, Jiroh; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,978,491, Cl. 264-154.000.

Kalina, Vladimir, to Nestec S.A. Alcohol production. 4,978,618, Cl. 435-162.000.

Kallestad Diagnostics, Inc.: *See*—
Mach, Patrick A.; Thompson, Jeffrey A.; Creager, Richard S.; and Fink, Cheri W., 4,978,632, Cl. 435-7.000.

Kaluza, Rudolph T., to National Graphics Company. Multiple ply assembly. 4,978,142, Cl. 282-11.50A.

Kalze, Franz-Josef: *See*—
Philipp-Buterowe, Wolfgang; and Kalze, Franz-Josef, 4,979,077, Cl. 362-61.000.

Kamada, Toru: *See*—
Tabata, Fumio; Sekiguchi, Hidenori; Kamada, Toru; and Sakata, Yuji, 4,979,195, Cl. 378-34.000.

Kamegi, Yoshito: *See*—
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.

Kamen, Melvin E.; Bernstein, Philip; and Defazio, Augustine, to Revlon, Inc. Glossy cosmetic product and method of producing same. 4,978,524, Cl. 424-64.000.

Kameyama, Isao; and Yoshizawa, Masaaki, to Yazaki Corporation. Movable connector. 4,978,313, Cl. 439-248.000.

Kami, Kuniaki: *See*—
Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara, Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, 4,977,902, Cl. 128-804.000.

Kamimura, Katsuyoshi: *See*—
Hiwatashi, Yutaka; Kamimura, Katsuyoshi; and Mine, Atsushi, 4,978,848, Cl. 250-231.160.

Kamis, Russell P.: *See*—
Dietlein, John E.; Kamis, Russell P.; and Klosowski, Jerome M., 4,978,706, Cl. 524-423.000.

Kammerer, Roger: *See*—
Beiler, Jeffrey A.; Johnson, Ralph K.; Kammerer, Roger; Kaya, Azmi; and Keyes, Marion A., IV, 4,978,425, Cl. 162-49.000.

Kamoshida, Takeshi: *See*—
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.

Kanai, Seita: *See*—
Edahiro, Takeshi; Kanai, Seita; and Ushio, Kouichi, 4,978,131, Cl. 280-91.000.

Kanayama, Kaoru; and Ichikawa, Shuji, to Mitsubishi Petrochemical Co., Ltd. Polyalkenylphenol compound. 4,978,810, Cl. 568-720.000.

Kanda, Kuniaki: *See*—
Asari, Akira; Kanda, Kuniaki; Okamoto, Hiroshi; and Ueda, Masakazu, 4,977,774, Cl. 72-456.000.

Kanebo, Ltd.: *See*—
Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, 4,978,740, Cl. 528-272.000.

Kaneko, Eiji: *See*—
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Kang, Seung-Il: *See*—
Kim, Geun; and Kang, Seung-Il, 4,978,993, Cl. 355-58.000.

Kanno, Tatsuya; Takahashi, Ikuo; Sasaki, Kenichi; Iguichi, Yoshihiro; and Fukuda, Yutaka, to Daicel Chemical Industries, Ltd. Optical disk of polycarbonate. 4,978,578, Cl. 428-412.000.

Kanoo, Masahide: *See*—
Uehara, Masao; Sasagawa, Katsuyoshi; Yamashita, Shinji; Sasaki, Masahiko; Saito, Katsuyuki; Kanoo, Masahide; Uchikubo, Akinobu; Nakagawa, Takehiro; and Hasegawa, Jun, 4,979,035, Cl. 358-98.000.

Kantemir, Anatoly D.: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla L., 4,978,466, Cl. 252-49.300.

Kanzaki Paper Mfg. Co., Ltd.: *See*—
Ogushi, Akira; and Uemura, Hisashi, 4,978,973, Cl. 346-76.0PH.

Kao Corporation: *See*—
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.
Kodama, Kenji; and Yamamoto, Yuzo, 4,978,399, Cl. 148-250.000.
Koshino, Junji; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,978,653, Cl. 512-21.000.
Motegi, Itsuro; Kawai, Michio; Imokawa, Genji; Nakamura, Koichi; and Takaishi, Naotake, 4,978,523, Cl. 424-59.000.
Suzuki, Akira; Ito, Susumu; Okamoto, Kikuhiko; Hoshino, Eiichi; Yokosuka, Michio; and Murata, Moriyasu, 4,978,470, Cl. 252-174.120.

Kaplan, Neil B., to Boston Auto Security, Inc. Automobile security system. 4,978,940, Cl. 340-426.000.

Karaki, Koichi; Sakai, Mitsugu; and Sasaki, Yasuo, to Olympus Optical Co., Ltd. Ultrasonic microscope having a focusing mechanism. 4,977,779, Cl. 73-606.000.

Karasaki, Toshihiko, to Minolta Camera Kabushiki Kaisha. Focus detection apparatus of camera. 4,978,988, Cl. 354-406.000.

Karasaki, Toshihiko: *See*—
Taniguchi, Nobuyuki; Karasaki, Toshihiko; Ishida, Tokuji; Hamada, Masataka; and Norita, Toshio, 4,979,045, Cl. 358-227.000.

Karkare, Subhash B.: *See*—
Dean, Robert C., Jr.; Grela, Peter V.; Karkare, Subhash B.; and Runstadler, Peter W., Jr., 4,978,616, Cl. 435-70.300.

Karmarkar, Subhash D.: *See*—
Ferrando, William A.; Divecha, Amarnath P.; and Karmarkar, Subhash D., 4,978,054, Cl. 228-194.000.

Karwoski, Stanley G.: *See*—
Lind, Robert J.; and Karwoski, Stanley G., 4,978,075, Cl. 239-690.000.

Kasahara, Keiji, to Abisare Co., Ltd. Paper sheet transporting method that applies an electrostatic attractive force between a paper sheet and a reinforcing insulating sheet prior to feeding. 4,978,118, Cl. 271-275.000.

Kasai, Hitoshi: *See*—
Hattori, Toshihiro; Ishihara, Masaki; Kasai, Hitoshi; and Moride, Shigeki, 4,979,117, Cl. 364-431.070.

Kasei Optonix, Ltd.: *See*—
Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, 4,978,472, Cl. 252-301.40H.
Umemoto, Akio; Aoki, Yuji; Numata, Katuyosi; and Suzuki, Hideo, 4,979,200, Cl. 378-185.000.

Kashima, Koji: *See*—
Yamagishi, Katsuaki; Kashima, Koji; Mitani, Akio; and Shimura, Masatoshi, 4,977,953, Cl. 165-10.000.

Kato, Hideshige: *See*—
Goko, Nobuaki; Uehara, Yumito; Kato, Hideshige; and Matsuda, Yukimasa, 4,978,722, Cl. 525-255.000.

Kato, Kanji: *See*—
Ueda, Hirotada; Kato, Kanji; and Matsushima, Hitoshi, 4,979,096, Cl. 364-200.000.

Kato, Noriaki: *See*—
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

Katoh, Osami; and Kusano, Hideaki, to Minolta Camera Kabushiki Kaisha. Image projecting system. 4,978,215, Cl. 353-26.00R.

Katoh, Shuji: *See*—
Aihara, Yasuyuki; Katoh, Shuji; Baba, Shigeki; and Akiyama, Eitetsu, 4,977,862, Cl. 123-41.120.

Katsuno, Hiroshi, to Sony Corporation. Ink ribbon cartridge for printing apparatus. 4,978,240, Cl. 400-224.200.

Katsuumi, Kazushige: *See*—
Ogawa, Minoru; Sakamoto, Koichiro; Tamura, Toshiyuki; and Katsuumi, Kazushige, 4,979,007, Cl. 357-30.000.

Kaufman, Arnold S., to Renco Systems, Inc. Fail-safe blower drive for roof mounted kitchen hood grease exhaust blowers. 4,977,884, Cl. 126-299.00R.

Kaufman, Jack W. Articles for the protection of living tissue. 4,977,904, Cl. 128-856.000.

Kaufman, John W., to AMP Incorporated. Surface mount pin header. 4,978,308, Cl. 439-83.000.

Kawabata, Yuka: *See*—
Awano, Hiroshi; Kawabata, Yuka; and Iwai, Takayoshi, 4,977,658, Cl. 29-25.010.

Kawachi, Masao; Takato, Norio; Jinguji, Kaname; Sugita, Akio; and Sumida, Shin, to Nippon Telegraph and Telephone Corporation. Integrated optical device and method for manufacturing thereof. 4,978,188, Cl. 350-96.120.

Kawaguchi, Toshikazu: *See*—
Kusumoto, Keiji; Kawaguchi, Toshikazu; and Nagata, Kenzo, 4,978,992, Cl. 355-51.000.

Kawahata, Kazunari, to Murata Manufacturing Co., Ltd. High frequency broad-band mixing circuit including an electrolytic capacitor in parallel with a local oscillator input port. 4,979,233, Cl. 455-330.000.

Kawai, Michio: *See*—
Motegi, Itsuro; Kawai, Michio; Imokawa, Genji; Nakamura, Koichi; and Takaishi, Naotake, 4,978,523, Cl. 424-59.000.

Kawaji, Toshikuni: *See*—
Yamazaki, Keiko; and Kawaji, Toshikuni, 4,978,531, Cl. 424-448.000.

Kawakami, Hiroshi: *See*—
Takano, Osamu; Kawakami, Hiroshi; and Yakuwa, Masahiko, 4,979,143, Cl. 364-900.000.

Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, to Kanebo, Ltd.; and Konica Corporation. Copolyester and polyester film having said copolyester as subbing layer. 4,978,740, Cl. 528-272.000.

Kawanishi, Tsuneaki: *See*—
Shimizu, Ryuichi; Kawanishi, Tsuneaki; Suzuki, Shigeo; Hosaka, Shigeo; Mori, Yasuki; and Narahara, Toshikazu, 4,978,596, Cl. 430-109.000.

Kawano, Mitsumo, to Kabushiki Kaisha Toshiba. Circuit for generating pulse having predetermined time period width based on trigger signal. 4,979,194, Cl. 377-55.000.

Kawasaki Steel Corporation: *See*—
Shibuya, Kiyoshi; Sato, Toru; Morito, Nobuyuki; Nara, Seiko; and Hiramatsu, Teruo, 4,977,949, Cl. 164-417.000.
Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.

Kawashima, Nobuhiro: *See*—
Morii, Mitsuyoshi; Ohoka, Masaharu; Suzuki, Toshihiko; Suzuki, Katsuyuki; Kawashima, Nobuhiro; Morii, Noriko; and Mori, Kunizo, 4,978,620, Cl. 435-226.000.

Kawata, Hiroshi. Display apparatus for automotive vehicle. 4,978,214, Cl. 353-14.000.

Kawata, Toshihiko; Mizuta, Ken; and Fukuda, Kazuaki, to Alps Electric Co., Ltd. Loading controlling apparatus. 4,979,066, Cl. 361-10.000.

Kaya, Azmi: *See*—
Beller, Jeffrey A.; Johnson, Ralph K.; Kammerer, Roger; Kaya, Azmi; and Keyes, Marion A., IV, 4,978,425, Cl. 162-49.000.

Kazarinov, Rudolf F.: *See*—
Blonder, Greg E.; Henry, Charles H.; Kazarinov, Rudolf F.; and Wolfe, Raymond, 4,978,189, Cl. 350-96.120.

Kazmierczak, Robert T.; and MacLeay, Ronald E., to Atochem North America, Inc. Light stabilizing flame retardants. 4,978,699, Cl. 529-99.000.

Keener, Don S.: *See*—
Bush, Gregory F.; Keener, Don S.; Morel, Jeanne E.; and Voorhees, Richard W., 4,979,148, Cl. 365-230.010.

Keep, Gerald T., to Eastman Kodak Company. Process for preparing selectively metallized articles. 4,978,569, Cl. 428-209.000.

Keimel, Ingrid M.: *See*—
Morse, Arthur L.; Gaalema, Steve D.; Keimel, Ingrid M.; and Hewitt, Mary J., 4,978,872, Cl. 307-490.000.

Keiper Recaro GmbH & Kg: *See*—
Pelz, Herbert; Kluting, Bernd; Wagener, Heinz-Jurgen; and Berghof, Hans-Joachim, 4,978,170, Cl. 297-411.000.

Kelch Corporation, The: *See*—
Larson, Robert M., 4,978,027, Cl. 220-366.000.

Kelleher, Denis M.: *See*—
LaRoche, Allan R.; Pearmain, Douglas S.; and Kelleher, Denis M., 4,977,719, Cl. 52-396.000.

Kelly, John R., to Massachusetts Institute of Technology. Dispersion strengthened composite. 4,978,640, Cl. 501-32.000.

Kelly, Peter Y., to Du Pont Canada Inc. Corona-discharge treated release films. 4,978,436, Cl. 204-165.000.

Kelly, Robert C.; Warpehoski, Martha A.; and Wierenga, Wendell, to Upjohn Company, The. 1,2,8,8a-tetrahydrocyclopropa (C) pyrrolo [3,2-e)]-indol-4(5H)-ones and related compounds. 4,978,757, Cl. 548-421.000.

Kelmar, John J. Iron reduction apparatus. 4,978,106, Cl. 266-177.000.

Kelso, William A.: *See*—
Wilson, P. Henry; and Kelso, William A., 4,978,132, Cl. 280-47.131.

Kennedy, Samuel S. Purse hanger. 4,978,093, Cl. 248-205.100.

Kepplinger, Werner, to Deutsche Voest-Alpine Industrienalagenbau GmbH. Process for the production of molten pig iron. 4,978,387, Cl. 75-445.000.

Keptel, Inc.: *See*—
Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., 4,979,209, Cl. 379-399.000.

Kerbaugh, Michael L.: *See*—
Bruce, James A.; Kerbaugh, Michael L.; Kwong, Ranee W.; Lee, Tanya N.; Linde, Harold G.; and Sachdev, Harbans S., 4,978,594, Cl. 430-14.000.

Kerneis, Jean C.: *See*—
Sabater, Jacques; Kerneis, Jean C.; and Bauduin, Serge, 4,978,861, Cl. 250-571.000.

Kerr-McGee Chemical Corporation: *See*—
Story, Phillip M., 4,978,396, Cl. 106-436.000.

Kersemakers, Jozef J. F. M.; Meijer, Henricus E. H.; and Martens, Gerardus, to Stamicarbon B.V. Process for injection moulding multilayered articles. 4,978,493, Cl. 264-255.000.

Kertz, Malcolm G., to Agristar, Inc. Automated system for micropropagation and culturing organic material. 4,978,505, Cl. 422-66.000.

Kesling, Haven S., Jr.: *See*—
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., 4,978,779, Cl. 560-344.000.

Kester, Lynn C. Screw-on watch stem seal. 4,979,156, Cl. 368-289.000.

Ketcham, Carl C., to Baker Hughes Incorporated. Method and apparatus for acoustic measurement of mud flow downhole. 4,979,112, Cl. 364-422.000.

Ketchum, Douglas: *See*—
Anandan, Munisamy; and Ketchum, Douglas, 4,978,888, Cl. 315-58.000.

Keutgen, Peter: *See*—
Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, 4,978,108, Cl. 266-220.000.

Kewpie Kabushiki Kaisha: *See*—
Kurokawa, Toru; Watanabe, Hiroyuki; Tanaka, Shoichi; and Mitsui, Fumito, 4,978,552, Cl. 426-559.000.

Keyes, Marion A., IV: *See*—
Beller, Jeffrey A.; Johnson, Ralph K.; Kammerer, Roger; Kaya, Azmi; and Keyes, Marion A., IV, 4,978,425, Cl. 162-49.000.

Khanin, Andrei M.: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Khanna, Dinesh N., to Hoechst Celanese Corp. Polyamide-polyamide-polyimide and polybenzoxazole-polyamide-polyimide polymer having at least one fluorine-containing linking group. 4,978,733, Cl. 528-170.000.

Khanna, Dinesh N., to Hoechst Celanese Corp. Polyamide-polyamide and polybenzoxazole-polyamide polymer. 4,978,734, Cl. 528-184.000.

Khanna, Dinesh N.: *See*—
Mueller, Werner H.; Vora, Rohitkumar H.; and Khanna, Dinesh N., 4,978,738, Cl. 528-220.000.
Khatibi, Farrokh: *See*—
Pao, Yoh-Han; and Khatibi, Farrokh, 4,979,126, Cl. 364-513.000.
Kheradpir, Shaygan, to GTE Laboratories Incorporated. Predictive access-control and routing system for integrated services telecommunication networks. 4,979,118, Cl. 364-436.000.
Khomich, Nikolai S.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.
Kida, Hiroyuki; Komagawa, Tooru; and Maejima, Hideo, to Hitachi, Ltd. Data processing method and apparatus having plural bus interfaces. 4,979,103, Cl. 364-200.000.
Kidnie, Kevin M.: *See*—
Elmasry, Mohamed A.; and Kidnie, Kevin M., 4,978,598, Cl. 430-137.000.
Kiekert GmbH & Co. Kommanditgesellschaft: *See*—
Kleefeldt, Frank; Menke, Johannes T.; and Kostler, Ulrich, 4,978,154, Cl. 292-201.000.
Kijima, Yasuhiko: *See*—
Isshiki, Tomiya; Kijima, Yasuhiko; Ito, Akiro; Miyauchi, Yuh; Konko, Takao; and Watanabe, Takayuki, 4,978,778, Cl. 560-261.000.
Kikko Foods Corporation: *See*—
Takada, Norihisa; Kojima, Saburo; Wakayama, Tadaaki; Omi, Kyoko; Kobayashi, Nobuyuki; and Okada, Hideyuki, 4,978,549, Cl. 426-489.000.
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Kisor, Gregory H.; Parker, James F.; and King, Edward J., 4,979,039, Cl. 358-133.000.
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Nakamura, Hisashi; Kubo, Ken-ichi; and Hirakawa, Toshiro, 4,977,882, Cl. 123-502.000.
Kubo, Yoshiaki; and Toya, Sinichi, to Tachi-S Co., Ltd. Vehicle seat. 4,978,158, Cl. 296-65.100.
Kubota, Akihiko: *See*—
Ito, Yasunobu; Yamada, Kunihiro; and Kubota, Akihiko, 4,979,072, Cl. 361-87.000.
Kubota, Ltd.: *See*—
Ishimori, Shoso; and Ishida, Mikio, 4,977,760, Cl. 60-444.000.
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.
Kubota, Takaharu: *See*—
Hosoda, Kenji; Suzuki, Hideaki; Kubota, Takaharu; and Nawata, Kiyoshi, 4,978,611, Cl. 435-7.000.
Kubota, Tetsumaru: *See*—
Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara, Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, 4,977,902, Cl. 128-804.000.
Kudo, Harumi: *See*—
Kishimoto, Yoshinobu; Ando, Takashi; and Kudo, Harumi, 4,979,061, Cl. 360-96.500.
Kuguminato, Hideo: *See*—
Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.
Kuhn, John J., to PPG Industries, Inc. Ramp circuit for control loop. 4,978,866, Cl. 307-228.000.
Kuipers, Charles A. Surface welded thermoplastic roofing system. 4,977,720, Cl. 52-408.000.
Kumada, Hiroyoshi: *See*—
Edahiro, Takeshi; Kumada, Hiroyoshi; Morita, Toshiki; Takehara, Shin; and Shibata, Mineharu, 4,978,135, Cl. 280-707.000.
Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi, to Kioritz Corporation. Two-stroke-cycle uniflow spark-ignition engine. 4,977,875, Cl. 123-299.000.
Kun, Leslie C., to Union Carbide Corporation. Turbomachine with seal fluid recovery channel. 4,978,278, Cl. 415-144.000.
Kunde, Klaus: *See*—
Weber, Karl-Arnold; Henk, Hermann; Kunde, Klaus; Westphal, Jochen; and Wunderlich, Klaus, 4,978,747, Cl. 534-735.000.
Kung, Viola T.; and Nagainis, Peter A., to Molecular Devices Corporation. DNA detection system. 4,978,608, Cl. 435-6.000.
Kunsemiller, John: *See*—
Farber, Bruce; Kunsemiller, John; and Barradas, Scott, 4,977,966, Cl. 173-159.000.
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Kuramoto, Masahiko: *See*—
Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, 4,978,730, Cl. 526-153.000.
Kurano, Yoshito: *See*—
Taniguchi, Katsuo; Fujikawa, Shigeki; and Kurano, Yoshito, 4,978,789, Cl. 564-305.000.
Kuriyama, Hiroshi: *See*—
Nakamura, Katsumi; Miyazaki, Kenichi; Hagiwara, Taro; and Kuriyama, Hiroshi, 4,978,164, Cl. 296-197.000.
Kuroda, Hirokazu: *See*—
Shimizume, Kazutoshi; and Kuroda, Hirokazu, 4,979,192, Cl. 375-111.000.
Kuroda, Nobuyuki; Kobayashi, Hiroshi; and Matsuura, Kazuo, to Nippon Oil Co., Ltd. Polymeric solid electrolyte. 4,978,473, Cl. 252-500.000.
Kurokawa, Toru; Watanabe, Hiroyuki; Tanaka, Shoichi; and Mitsui, Fumito, to Kewpie Kabushiki Kaisha. Starch containing. 4,978,552, Cl. 426-559.000.
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, to Sanwa Kagaku Kenkyusho Co., Ltd. Hydantoin derivatives for treating complications of diabetes. 4,978,758, Cl. 548-309.000.
Kurowski, Benedict, to Paasche Airbrush Co. Gravity feed airbrush. 4,978,072, Cl. 239-346.000.
Kurozumi, Seizi: *See*—
Ikegami, Shiro; Torizawa, Yasuhiro; and Kurozumi, Seizi, 4,978,775, Cl. 560-119.000.
Kurtovic, Zlatko: *See*—
Grabovac, Bosko; and Kurtovic, Zlatko, 4,977,775, Cl. 73-1.00C.
Kurusu, Hidetoshi: *See*—
Ona, Isao; Ozaki, Masaru; and Kurusu, Hidetoshi, 4,978,363, Cl. 8-581.000.
Kurz, Karl: *See*—
Berger, Siegbert; Kurz, Karl; and Mayer, Alfred, 4,978,815, Cl. 200-11.0TC.
Kusaka, Kenji: *See*—
Fujiwara, Akinori; Matsuoka, Hiroshi; Onoe, Susumu; and Kusaka, Kenji, 4,978,409, Cl. 156-315.000.
Kusano, Chushiro; Tanoue, Tomonori; and Mitani, Katsuhiko, to Hitachi, Ltd. Heterojunction bipolar transistor. 4,979,009, Cl. 357-34.000.
Kusano, Hideaki: *See*—
Katoh, Osami; and Kusano, Hideaki, 4,978,215, Cl. 353-26.00R.
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Kwong, Ranee W.: *See*—
Bruce, James A.; Kerbaugh, Michael L.; Kwong, Ranee W.; Lee, Tanya N.; Linde, Harold G.; and Sachdev, Harbans S., 4,978,594, Cl. 430-14.000.

Kwun, Hegeon; and Burkhardt, Gary L., to Southwest Research Institute. Non-destructive evaluation of ropes by using transverse impulse vibrational wave method. 4,979,125, Cl. 364-507.000.

Kyowa Medex Co., Ltd.: *See*—
Aoyama, Norihito; Miike, Akira; Shimizu, Yoshiaki; and Tatano, Toshio, 4,978,615, Cl. 435-25.000.

Kysela, Ernst; and Braden, Rudolf, to Bayer Aktiengesellschaft. Process for introducing fluorine atoms into aromatic rings by nucleophilic exchange. 4,978,769, Cl. 558-423.000.

Kysela, Ernst: *See*—
Kraatz, Udo; Kysela, Ernst; Hartwig, Jurgen; and Becker, Benedikt, 4,978,382, Cl. 71-92.000.

L & L International Sweden Aktiebolag: *See*—
Larsson, Jan-Åke; and Johansson, Leif, 4,978,554, Cl. 426-604.000.

La Compagnie Viticole et Fermiere Edmond et Benjamin de Rothschild S.A.: *See*—
Colin, Gerard; and Conroy, Michael, 4,978,539, Cl. 426-11.000.

Labbe, Francois P. Drag reducer for rear end of vehicle. 4,978,162, Cl. 296-180.200.

Labouze, Joseph; and Teboul, Pierre. Non-reusable syringe. 4,978,339, Cl. 604-110.000.

Lafferty, John J.; DeMarinis, Robert M.; and Venslavsky, Joseph W., to SmithKline Beecham Corporation. α-adrenergic receptor antagonists. 4,978,660, Cl. 514-215.000.

Laine, Donald D.; Rochte, Jerry E.; and Wolcott, Frederick C., to Cavro Scientific Instruments. XYZ positioner. 4,979,093, Cl. 364-167.010.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Campo, Philippe; Cocolios, Panayotis; Dognin, Paul; and Ledon, Henry, 4,978,802, Cl. 568-432.000.
Cutayar, Jacques-Marcel; Poillon, Dominique; and Cutayar, Sylvie, 4,978,545, Cl. 426-312.000.
Dubrulle, Gerard; and Roullet, Alain, 4,977,723, Cl. 53-110.000.
Grenier, Maurice; and Mazieres, Philippe, 4,977,746, Cl. 62-22.000.

L'Air Liquide, Society Anonyme pour l'Étude et l'Exploitation des Procedes Georges Claude: *See*—
Frejaville, Serge; Mittelman, Philippe; Rajaonarivello, Claude; and Naud, Jean-Michel, 4,977,747, Cl. 62-50.100.

Lakin, Eric D.: *See*—
Huss, John; Hoppe, Richard J.; Crowe, Lawrence E.; Sutrina, Thomas; and Lakin, Eric D., 4,979,090, Cl. 363-141.000.

Lambert, David V.: *See*—
Goldenfield, Mark P.; Lambert, David V.; and Shannon, Robert E., 4,978,917, Cl. 324-226.000.

Lamberti, Angela C.: *See*—
Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., 4,978,421, Cl. 156-645.000.

Laminar Fluid Controls, Inc.: *See*—
Feild, Eugene P., 4,977,919, Cl. 251-205.000.

Lamm, Foster P., to United Technologies Corporation. Method for applying diffusion coating masks. 4,978,558, Cl. 427-250.000.

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Landa, Joseph; and Landa, Michael. Boat mooring device. 4,977,846, Cl. 114-230.000.

Landa, Michael: *See*—
Landa, Joseph; and Landa, Michael, 4,977,846, Cl. 114-230.000.

Landford, Bette W. Automotive glare shield. 4,978,159, Cl. 296-97.600.

Lang, Howard J.: *See*—
Gale, John C.; and Lang, Howard J., 4,978,255, Cl. 408-1.00R.

Lang, Paul W.; and Gribshaw, Franklin C. Polarized light 360 degree viewing system. 4,979,026, Cl. 358-64.000.

Langballe, Logan C.; Koszewa, Bernhard; and Blicher, Steen, to Biomat Feeding Systems, Inc. Animal feeding apparatus. 4,977,858, Cl. 119-51.500.

Lange, David V.: *See*—
Cronin, Dennis C.; and Lange, David V., 4,978,428, Cl. 162-358.000.

Lange, Fredric A., to Interlock Structures International, Inc. Fastener apparatus. 4,978,244, Cl. 403-379.000.

Lange, Harold T., Sr., to Sporlan Valve Company. Thermostatic expansion valve with bi-directional flow. 4,978,062, Cl. 236-92.00B.

Langford, Gordon E., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Scale-up and synthesis of 1-methoxycycloheptа-1,3,5-triene. 4,978,806, Cl. 568-667.000.

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Lanxide Technology Company, LP: *See*—
White, Danny R.; and Claar, Terry D., 4,978,644, Cl. 501-96.000.

Lapadula, Constantino: *See*—
Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., 4,978,421, Cl. 156-645.000.

Lapota, David; Mastny, Gary F.; and Copeland, Hugh D., to United States of America, Navy. Bioluminescent detector. 4,978,854, Cl. 250-361.00C.

Laprade, Bruce N.: *See*—
White, Paul L.; and Laprade, Bruce N., 4,978,885, Cl. 313-103.0CM.

Larkey, Roger. Portable pitching practice system. 4,978,121, Cl. 273-26.00A.

Larkin, John M.: *See*—
Sanderson, John R.; and Larkin, John M., 4,978,785, Cl. 562-537.000.

LaRoche, Allan R.; Pearmain, Douglas S.; and Kelleher, Denis M. Fire resistant expansion joint. 4,977,719, Cl. 52-396.000.

Larsen, David W.; and Manahan, Stanley E., to Chem Char Research, Inc. Process for treatment of hazardous wastes by reverse burn gasification. 4,978,477, Cl. 252-626.000.

Larson, Robert M., to Kelch Corporation, The. Fuel tank with vent system. 4,978,027, Cl. 220-366.000.

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Lasa Industries, Inc.: *See*—
Barrett, William A.; and Puri, Amitabh, 4,978,841, Cl. 250-548.000.

Lau, Jurgen; and Siegemund, Gunter, to Hoechst Aktiengesellschaft. 4,4'-bis[2-(4-hydroxy-amino-phenyl)hexafluoroisopropyl]-diphenylethers and their use. 4,978,790, Cl. 564-315.000.

Laurent, Pierre: *See*—
Pigneul, Raymond; Ruppel, Remy; and Laurent, Pierre, 4,978,565, Cl. 428-156.000.

Lautzenhiser, John L.: *See*—
Lautzenhiser, Lloyd L.; and Lautzenhiser, John L., 4,978,899, Cl. 318-269.000.

Lautzenhiser, Lloyd L.; and Lautzenhiser, John L. Conveyance with electronic control for motors. 4,978,899, Cl. 318-269.000.

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Lazzari, Jean-Pierre, to Commissariat a l'Energie Atomique. Air cushion conveying device with magnetic guidance. 4,978,253, Cl. 406-88.000.

Lazzeroni, John J.; and Lazzeroni, Melinda K. Vented motorcycle helmet speaker enclosure. 4,977,975, Cl. 181-129.000.

Lazzeroni, Melinda K.: *See*—
Lazzeroni, John J.; and Lazzeroni, Melinda K., 4,977,975, Cl. 181-129.000.

Leach, Dennis; and Dinmore, Clive, to Courtney Pope Lighting Limitd. Electrical supply system. 4,979,081, Cl. 362-219.000.

Leahy, John F.: *See*—
Johnson, Nancy C.; Gill, Robert C.; Leahy, John F.; Gotzmer, Carl, Jr.; Fillman, Harold T.; and , 4,978,482, Cl. 264-3.100.

Leake, Craig; Foran, Michael; and Atkinson, Jeffrey G., to National Starch and Chemical Investment Holding Corporation. Process of using starch based corrugating adhesives. 4,978,411, Cl. 156-336.000.

Lecerf, Michel J. M.: *See*—
Langlois, Jean-Pierre M. F.; and Lecerf, Michel J. M., 4,978,254, Cl. 407-33.000.

Ledon, Henry: *See*—
Campo, Philippe; Cocolios, Panayotis; Dognin, Paul; and Ledon, Henry, 4,978,802, Cl. 568-432.000.

Lee, Adrian C.: *See*—
Hua, Chang-Hwang; Chan, Simon S.; Day, Ding-Yuan S.; and Lee, Adrian C., 4,978,639, Cl. 437-230.000.

Lee, Gim F.: *See*—
Brown, Sterling B.; McFay, Dennis J.; Yates, John B., III; and Lee, Gim F., 4,978,715, Cl. 525-92.000.

Lee, Len F., to Monsanto Company. Substituted 2, 6-substituted pyridine compounds. 4,978,384, Cl. 71-94.000.

Lee, Robert D., to Dallas Semiconductor Corporation. Split lead package. 4,979,016, Cl. 357-70.000.

Lee, Tanya N.: *See*—
Bruce, James A.; Kerbaugh, Michael L.; Kwong, Ranee W.; Lee, Tanya N.; Linde, Harold G.; and Sachdev, Harbans S., 4,978,594, Cl. 430-14.000.

Lee, Tung-Ching. Production of frozen foods and other products. 4,978,540, Cl. 426-61.000.

Lefebvre, Rene : *See*—
Combettes, Christian; and Lefebvre, Rene , 4,978,916, Cl. 324-212.000.

Legault, Claude; and Deguire, Pierre. Delay action electronic timer lock with automatic cancellation cam. 4,977,765, Cl. 70-268.000.

Lehman, Lark E.: *See*—
Bryans, Mark A.; Cline, James H.; Frazee, Francis B.; and Lehman, Lark E., 4,979,185, Cl. 375-20.000.

Leisinger, Roger; and Meixner, Erwin, to Mettler Instrumente AG. Weighing apparatus with calibration weight means. 4,977,969, Cl. 177-50.000.

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Leng, John L.: *See*—
Dalton, Raymond F.; and Leng, John L., 4,978,788, Cl. 564-265.000.

Lenson, Walter J. Erosion control device. 4,978,247, Cl. 405-15.000.

Lentine, Anthony L.: *See*—
Hinton, Harvard S.; Lentine, Anthony L.; and Miller, David A. B., 4,978,842, Cl. 250-213.00A.

Lenz, Erwin. Apparatus and method for extracting focused solar radiant energy. 4,977,744, Cl. 60-641.150.

Lenz, Marvin K.: *See*—
Finnerty, Suja P.; and Lenz, Marvin K., 4,978,543, Cl. 426-243.000.

Lenz, William: *See*—
Edgley, Richard R.; Gierut, Frederick J.; and Lenz, William, 4,978,315, Cl. 439-441.000.

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Levy, David F.: *See*—
Snashall, Martin G.; Andrews, Mark R.; and Levy, David F., 4,979,022, Cl. 358-22.000.

Lex Computer and Management Corporation: *See*—
Westland, William F.; and Tindell, James M., 4,979,050, Cl. 360-14.100.

Leybold Aktiengesellschaft: *See*—
Kabelitz, Hans-Peter; Kaiser, Winfried; and Stueber, Hans-Guenter, 4,978,276, Cl. 415-55.300.
Wirz, Peter, 4,978,437, Cl. 204-192.230.

LGZ Landis & Gyr Zug AG: *See*—
Popovic, Radivoje; Solt, Katalin; and Lienhard, Heinz, 4,979,149, Cl. 365-244.000.

Li, Hsun-Feng; and Hsieh, Yih-Trong, to Industrial Technology Research Institute. Method of creating hollow multistroke characters. 4,979,130, Cl. 364-518.000.

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Liebl, Helmut; and Senetinger, Bertold, to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V. Electron microscope for investigation of surfaces of solid bodies. 4,978,855, Cl. 250-310.000.

Lienhard, Heinz: *See*—
Popovic, Radivoje; Solt, Katalin; and Lienhard, Heinz, 4,979,149, Cl. 365-244.000.

Lieutaud, Olivier; and Marie, Alain, to General Electric CGR S.A. Mammograph. 4,979,196, Cl. 378-37.000.

Lievens, Hugo: *See*—
Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, 4,978,586, Cl. 428-625.000.

Lifshitz, Nadia: *See*—
Andrews, John M., Jr.; Lifshitz, Nadia; and Smolinsky, Gerald, 4,978,915, Cl. 324-158.00R.

Light & Shadow Inc.: *See*—
Silverstein, Steven; and Scholz, Christopher, 4,978,004, Cl. 206-224.000.

Likholobov, Vladimir A.: *See*—
Surovikin, Vitaly F.; Plaxin, Georgy V.; Semikolenov, Vladimir A.; Likholobov, Vladimir A.; and Tiunova, Ilona J., 4,978,649, Cl. 502-416.000.

Liles, Donald T., to Dow Corning Corporation. Method of producing silicone emulsion. 4,978,710, Cl. 524-837.000.

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Lin, Muh Q.; Lin, Pi F.; Lin, Yih J.; Lin, Cheng H.; and Lin, Ming J., 4,978,110, Cl. 135-20.000.

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Lin, Ming J.: *See*—
Lin, Muh Q.; Lin, Pi F.; Lin, Yih J.; Lin, Cheng H.; and Lin, Ming J., 4,978,110, Cl. 135-20.000.

Lin, Muh Q.; Lin, Pi F.; Lin, Yih J.; Lin, Cheng H.; and Lin, Ming J. Fire protection unbrella. 4,978,110, Cl. 135-20.000.

Lin, Pi F.: *See*—
Lin, Muh Q.; Lin, Pi F.; Lin, Yih J.; Lin, Cheng H.; and Lin, Ming J., 4,978,110, Cl. 135-20.000.

Lin, Tai-Shun; and Prusoff, William H., to Yale University. Use of 3'-deoxythymidin-2'-ene (3'deoxy-2',3'-didehydrothymidine) in treating patients infected with retroviruses. 4,978,655, Cl. 514-50.000.

Lin, Yih J.: *See*—
Lin, Muh Q.; Lin, Pi F.; Lin, Yih J.; Lin, Cheng H.; and Lin, Ming J., 4,978,110, Cl. 135-20.000.

Lin, Yih-Shung: *See*—
Liou, Fu-Tai; Lin, Yih-Shung; and Chen, Fusen E., 4,978,637, Cl. 437-193.000.

Lind, Robert J.; and Karwoski, Stanley G., to Graco Inc. Solvent resistant electrostatic spray gun. 4,978,075, Cl. 239-690.000.

Lindblad, Nero R.: *See*—
Frankel, Neil A.; Lindblad, Nero R.; Relyea, Herbert C.; and Meyer, Robert J., 4,978,999, Cl. 355-299.000.

Linde, Harold G.: *See*—
Bruce, James A.; Kerbaugh, Michael L.; Kwong, Ranee W.; Lee, Tanya N.; Linde, Harold G.; and Sachdev, Harbans S., 4,978,594, Cl. 430-14.000.

Ling, Zhang A.; and Han, Wang C. Multiple disposable plastic bag assembly. 4,978,231, Cl. 383-11.000.

Lins, Reinhard, to Hilti Aktiengesellschaft. Cutting tool. 4,978,258, Cl. 408-187.000.

Lion Corporation: *See*—
Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, 4,978,681, Cl. 514-557.000.

Liotta, Frank J., Jr.: *See*—
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., 4,978,779, Cl. 560-344.000.

Liou, Fu-Tai; Lin, Yih-Shung; and Chen, Fusen E., to SGS-Thomson Microelectronics, Inc. Local interconnect process for integrated circuits. 4,978,637, Cl. 437-193.000.

Lioy, Daniel C.; Hurtubis, Edward F.; and Schickler, Edward R., to Eastman Kodak Company. Nickel coated shot blasted web conveying roller. 4,977,656, Cl. 29-121.800.

Littke, Mark E., to Brentwood Enterprises, Ltd. Drive system for railroad track vehicle. 4,977,796, Cl. 74-665.00T.

Little, John D.: *See*—
Rowe, Carroll G.; and Little, John D., 4,977,734, Cl. 56-15.900.

Liu, Yow-Juang; and Hadjizadeh-Amini, Zahra, to Advanced Micro Devices, Inc. Method of detecting the width of lightly doped drain regions. 4,978,627, Cl. 437-44.000.

Lloyd, Robert C.: *See*—
Lulloff, Ricky H.; Ruhnke, Jeffrey P.; and Lloyd, Robert C., 4,977,741, Cl. 60-310.000.

Lobdell, Donn D., to Cobe Laboratories, Inc. Sterile blood component collection. 4,978,446, Cl. 210-206.000.

Logan, James R.: *See*—
Mallick, George T., Jr.; Logan, James R.; and Eckels, Phillip W., 4,978,922, Cl. 324-652.000.

Logan, Terry L.: *See*—
Schwoebel, Jeffrey J.; and Logan, Terry L., 4,978,172, Cl. 299-12.000.

Lohoefer, Georg, to Deutsche Forschungsanstalt fur Luft-und Raumfahrt eV. Device for positioning and melting electrically conductive materials without a receptacle. 4,979,182, Cl. 373-138.000.

Long, Sam. Aeration chamber for a sewage treatment system. 4,978,445, Cl. 210-195.300.

Lonza Ltd.: *See*—
Baiker, Alfons; and Gasser, Daniel, 4,978,513, Cl. 423-245.300.
Volker, Theodor; and Althaus, Hans, 4,978,791, Cl. 564-335.000.

Loo, Robert Y.: *See*—
Hsu, Tsung-Yuan; Wu, Shin-Tson; and Loo, Robert Y., 4,978,208, Cl. 351-45.000.

Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, to Board of Regents, The University of Texas System. Composition and method for treatment of disseminated fungal infections in mammals. 4,978,654, Cl. 514-31.000.

L'Oreal: *See*—
Morane, Bruno; and Joulia, Gerard, 4,978,035, Cl. 222-108.000.

Lorenz, Horst, to Robert Krups Stiftung & Co. KG. Machine for brewing hot beverages. 4,977,819, Cl. 99-279.000.

Lorenzoni, Loreno: *See*—
Messina, Giuseppe; Sechi, Giovanni; Lorenzoni, Loreno; and Bruzzi, Vittorio, 4,978,786, Cl. 564-160.000.

Louderback, Allan L. Method of treating white blood cells. 4,978,688, Cl. 514-722.000.

Lovas, Istvan: *See*—
Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., 4,978,421, Cl. 156-645.000.

Love, William D.: *See*—
Tiarney, Thomas C., Jr.; Love, William D.; and Moorman, David K., 4,978,051, Cl. 228-122.000.

Lowering Systems, Inc.: *See*—
Heinisch, Richard V., 4,979,086, Cl. 362-297.000.

Lowry, Frank P., to Westvaco Corporation. Production of high strength linerboard with oxygen and alkali. 4,978,426, Cl. 162-65.000.

Luchetta, Joseph F.; and Eberle, Louis C., to Alfa-Laval AB. Method and apparatus for cleaning in place of a decanter centrifuge. 4,978,331, Cl. 494-37.000.

Luck, Edward E.; and Brown, Dennis M., to Matrix Pharmaceutical, Inc. Treatments employing vasoconstrictive substances in combination with cytotoxic agents for introduction into cellular lesion areas. 4,978,332, Cl. 604-19.000.

Luftglass, Bryan K.: *See*—
Hofmann, John E.; Sun, William H.; and Luftglass, Bryan K., 4,978,514, Cl. 423-235.000.

Luijtjes, Nicolaas G.; Galanakis, Claire T.; and Whalen, Barry H., to Microelectronics and Computer Technology Corporation. Method of clamping electrical contacts for laser bonding. 4,978,835, Cl. 219-121.640.

Luke, John A., to British-American Tobacco Company. Tobacco reconstitution. 4,977,908, Cl. 131-375.000.

Lukonina, Olga A.: *See*—
Drobadenko, Valery P.; and Lukonina, Olga A., 4,978,251, Cl. 406-50.000.

Lulloff, Ricky H.; Ruhnke, Jeffrey P.; and Lloyd, Robert C., to Brunswick Corporation. Combination exhaust manifold and exhaust elbow for marine propulsion system. 4,977,741, Cl. 60-310.000.

Lum, James: *See*—
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

Lund, Earl A. E.: *See*—
Shankland, Ian R.; and Lund, Earl A. E., 4,978,467, Cl. 252-69.000.

Lundbeck, Michael W. Retainer for eyewear. 4,978,210, Cl. 351-157.000.

Lundberg, Robert D.: *See*—
Peiffer, Dennis G.; Lundberg, Robert D.; Newlove, John C.; and Werlein, Eugen R., 4,978,461, Cl. 252-8.511.

Lynde, Gerald D.; and Harvey, Harold H., Jr., to Tri-State Oil Tools, Inc. Cutting tool for removing materials from well bore. 4,978,260, Cl. 166-55.600.

Lyons, John W.; Roper, John A., III; and Aldrich, Peter D., to Dow Chemical Company, The. Method and apparatus for fiber optic backscattered light measurement to determine flow rates of multiphase streams. 4,978,863, Cl. 250-574.000.

M. H. Detrick Co.: *See*—
Farrell, Kenneth L.; Cona, John A.; Glugla, Ronald; and Bly, Lloyd G., 4,977,838, Cl. 110-173.00R.

M&T Chemicals, Inc.: *See*—
Silbermann, Joseph; and Burchill, Michael T., 4,978,576, Cl. 428-409.000.

MacDermid, Incorporated: *See*—
Letize, Raymond A., 4,978,422, Cl. 156-656.000.

MacDonald, James C.: *See*—
Purohit, Parul V.; Kirsch, Jeffery L.; and MacDonald, James C., 4,978,577, Cl. 428-409.000.

Mach, Patrick A.; Thompson, Jeffrey A.; Creager, Richard S.; and Fink, Cheri W., to Kallestad Diagnostics, Inc. Method of pre-treating samples in peroxidase-catalyzed enzyme assays. 4,978,632, Cl. 435-7.000.

Machida, Junji: *See*—
Anno, Masahiro; Machida, Junji; Ohtani, Junji; Sano, Eiichi; and Masuda, Fumio, 4,978,595, Cl. 430-106.600.

Machida, Kaoru; Kikuchi, Yusichi; Takano, Masayuki; and Kobayashi, Noriyoshi, to Kabushiki Kaisha Toshiba. Ultrasonic probe device. 4,977,780, Cl. 73-644.000.

Macke, Jeffrey D.: *See*—
Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., 4,978,782, Cl. 562-125.000.
Newallis, Peter E.; Macke, Jeffrey D.; Steinbeck, Karl G.; and Wasleski, Daniel N., 4,978,795, Cl. 568-56.000.

MacLean, Malcolm K.; and Daniels, Mark E., to General Electric Company. Nozzle with thrust vectoring in the yaw direction. 4,978,071, Cl. 239-265.190.

MacLeay, Ronald E.: *See*—
Kazmierczak, Robert T.; and MacLeay, Ronald E., 4,978,699, Cl. 529-99.000.

Madden, Thomas E.: *See*—
Alessi, Paula J.; Giorgianni, Edward J.; and Madden, Thomas E., 4,979,032, Cl. 358-76.000.

Madden, Thomas J.; Schlein, Barry C.; and Wagner, W. Barry, to United Technologies Corporation. Dual fuel injector. 4,977,740, Cl. 60-39.463.

Mader, Gerald E., to Schwitzer U.S.A. Inc. Free floating dam for a fluid shear coupling apparatus. 4,977,990, Cl. 192-58.00B.

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Kajiwara, Shigeru; Maeda, Hidekatsu; and Suzuki, Hideo, 4,978,619, Cl. 435-182.000.

Maeda, Kouzo: *See*—
Hikone, Makoto; Maeda, Kouzo; and Yoshioka, Masanobu, 4,978,138, Cl. 280-777.000.

Maeda, Yoshiharu; Mizuno, Yukio; Nakatani, Akira; and Yamano, Mitsuhisa, to Takeda Chemical Industries, Ltd. Crystals of cephem hydrochloride. 4,978,752, Cl. 540-222.000.

Maejima, Hideo: *See*—
Kida, Hiroyuki; Komagawa, Tooru; and Maejima, Hideo, 4,979,103, Cl. 364-200.000.

Maejima, Mokichi, to Jyohoku Seiko Co., Ltd. Film extrusion die. 4,978,289, Cl. 425-141.000.

Maejima, Toshiro, to Yazaki Corporation. Waterproof press-connecting connector. 4,978,314, Cl. 439-398.000.

Maezawa, Hiroshi; Tomotsu, Norio; and Kuramoto, Masahiko, to Idemitsu Kosan Company Limited. Process for producing styrene-based polymers and catalyst for use therein. 4,978,730, Cl. 526-153.000.

Mage, Jean-Claude; Rolland, Jean-Luc; and Castera, Jean-Paul, to Thomson-CSF. Magnetic recording/playback head comprising a superconducting material. 4,979,064, Cl. 360-125.000.

Magni Systems, Inc.: *See*—
Schuster, Daniel L, 4,978,924, Cl. 330-254.000.

Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebeca J., to Texas Instruments Incorporated. Scanning electron microscope based parametric testing method and apparatus. 4,978,908, Cl. 324-158.00R.

Maheas, Rene . Process for the manufacture of stockable dense road asphalts. 4,978,393, Cl. 106-281.100.

Mahoney, Pual E., to Delta Clutch, Inc. Multiple disc clutch. 4,977,991, Cl. 192-70.190.

Mahulikar, Deepak: *See*—
Fister, Julius C.; Cherukuri, Satyam C.; Mahulikar, Deepak; and O'Donnelly, Brian E., 4,978,052, Cl. 228-123.000.

Maier, Willy; Bachmann, Thomas; Konrad, Martin; and Staub, Markus, to Daverio AG. Apparatus for conveying printing plates. 4,978,117, Cl. 271-206.000.

Maimoni, Arturo, to United States of America, Energy. Lamella settler crystallizer. 4,978,509, Cl. 422-245.000.

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Mainiero, Michael R.: *See*—
Mainiero, John W.; Mainiero, Michael R.; and Heinlein, Thomas J., 4,978,943, Cl. 340-566.000.

Maiocco, Roberto; and Basadonna, Luciano, to Digital Electronics Automation, Inc. Interactive graphics system and method for modelling physical articles. 4,979,224, Cl. 382-8.000.

Maiorana, Stefano: *See*—
Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., 4,978,673, Cl. 514-411.000.

Maisotsenko, Valery S.; and Gershuni, Alexandr N. Method for indirect-evaporative air cooling. 4,977,753, Cl. 62-121.000.

Major, Miklos, to Microsonic, Inc. Connector for hearing air earmold. 4,977,976, Cl. 181-130.000.

Makovec, Francesco: *See*—
Rovati, Angelo L.; Rovati, Claudio L.; and Makovec, Francesco, 4,978,683, Cl. 514-617.000.

Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., to Sprint International Communications Corp. Communication processor for a packet-switched network. 4,979,100, Cl. 364-200.000.

Malakhova, Irina V.: *See*—
Matros, Jury S.; Zagoruiko, Andrei N.; Malakhova, Irina V.; and Eremin, Oleg G., 4,978,519, Cl. 423-574.00R.

Malcolm, David H.; and Wilenius, George P. T. Method for production of fluoroscopic and radiographic x-ray images and hand held diagnostic apparatus incorporating the same. 4,979,198, Cl. 378-102.000.

Male, Alan T.: *See*—
Eiffler, Elmer E.; Iyer, Natraj C.; Male, Alan T.; and Boes, David J., 4,978,487, Cl. 264-60.000.

Malin, Michael J.: *See*—
Cremins, John F.; Kim, Young R.; Malin, Michael J.; and Sclafani, Louis D., 4,978,624, Cl. 436-17.000.

Mall, Michael G.: *See*—
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

Mallick, George T., Jr.; Logan, James R.; and Eckels, Phillip W., to Westinghouse Electric Corp. Superconducting sensor for quench detection in a superconductor. 4,978,922, Cl. 324-652.000.

Mallinckrodt, Inc.: *See*—
Sexton, James E., 4,978,544, Cl. 426-243.000.

Malsheen, Bathsheba J.; Groner, Gabriel F.; and Williams, Linda D. Text to speech synthesis system and method using context dependent vowel allophones. 4,979,216, Cl. 381-52.000.

Maltiel, Ron. Electrical measurements of the profile of semiconductor devices during their manufacturing process. 4,978,923, Cl. 324-693.000.

Man Roland Druckmaschinen AG: *See*—
Walter, Claus, 4,977,831, Cl. 101-365.000.
Walter, Claus, 4,977,832, Cl. 101-365.000.

Manahan, Stanley E.: *See*—
Larsen, David W.; and Manahan, Stanley E., 4,978,477, Cl. 252-626.000.

Mann, Donaerl B., to Interstate Medical Marketing, Inc. Hand splint. 4,977,890, Cl. 128-77.000.

Mannesmann Aktiengesellschaft: *See*—
Becker, Klaus; and Ostholt, Rudiger, 4,978,266, Cl. 411-61.000.

Mannix, James D. Baiting method and device. 4,977,699, Cl. 43-4.000.

Manns, William G.; Wood, Anthony B.; and Norwood, David A., to Texas Instruments Incorporated. Data handling system for pattern inspector or writer. 4,979,223, Cl. 382-8.000.

Mansfield, Peter; Chapman, Barry L. W.; Turner, Robert; and Bowley, Roger M., to National Research Development Corporation. Magnetic field screens. 4,978,920, Cl. 324-318.000.

Mapp, James: *See*—
Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., 4,979,100, Cl. 364-200.000.

Marconi, Franco, to Siemens Telecommunicazioni S.p.A. Wideband microwave hybrid circuit with in-phase or phase-inverted output signals. 4,978,933, Cl. 333-117.000.

Marguinaud, Andre : *See*—
Fontanes, Sylvain; Birot, Patrice; Marguinaud, Andre ; Quignon, Thierry; and Romann, Brigitte, 4,979,215, Cl. 381-49.000.

Marhula, Adolph V. Ice chip clearing tool. 4,978,156, Cl. 294-1.100.

Marie, Alain: *See—*
Lieutaud, Olivier; and Marie, Alain, 4,979,196, Cl. 378-37.000.

Marino, Gaye: *See—*
Blizzard, Timothy A.; Mrozik, Helmut; Marino, Gaye; and Sinclair, Peter J., 4,978,656, Cl. 514-63.000.

Marinoni, Mario, to Casma S.p.A. Door mounting with side opening for insertion of pivot pin. 4,977,642, Cl. 16-257.000.

Markiewicz, W. Denis; Ciancetta, Gary; and Jonas, Philip, to Intermagnetics General Corporation. Superconducting magnetic coil element having terminals bonded to the coil body. 4,978,936, Cl. 335-216.000.

Maroudas, Ioannis; and Maroudas, Theodora M. Modular frame for fruit baskets. 4,978,019, Cl. 220-4.00C.

Maroudas, Theodora M.: *See—*
Maroudas, Ioannis; and Maroudas, Theodora M., 4,978,019, Cl. 220-4.00C.

Marquis, Edward T.: *See—*
Sanderson, John R.; Marquis, Edward T.; and Payton, Howard F., 4,978,799, Cl. 568-385.000.
Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., 4,978,800, Cl. 568-385.000.

Marrelli, John D., to Texaco Inc. Demulsifier control system and method. 4,977,915, Cl. 137-4.000.

Marrs, Thomas L. Remote dispenser for fish attractant. 4,977,854, Cl. 118-683.000.

Mars Incorporated: *See—*
Pruden, Benny J.; Wisnik, Howard; and Hudis, Scott, 4,979,208, Cl. 379-145.000.

Marshall, Perry C. Loft indicator and lie detector for golf club heads. 4,977,680, Cl. 33-508.000.

Martens, Gerardus: *See—*
Kersemakers, Jozef J. F. M.; Meijer, Henricus E. H.; and Martens, Gerardus, 4,978,493, Cl. 264-255.000.

Martin Marietta Energy Systems, Inc.: *See—*
Hendrix, Donald E.; and Smith, Stephen F., 4,978,909, Cl. 324-77.00B.

Martin, Thierry: *See—*
Alquier, Bruno; Belou, Olivier; Devienne, Paul; and Martin, Thierry, 4,978,089, Cl. 244-129.500.

Martinelli, Michael A., to Intra-Sonix, Inc. Method of making a transducer. 4,977,655, Cl. 29-25.350.

Martinez, Kenneth: *See—*
Bottoms, Stanley; Betts, William L.; and Martinez, Kenneth, 4,979,184, Cl. 375-13.000.

Martino, William L., Jr.: *See—*
Remington, Scott; and Martino, William L., Jr., 4,979,145, Cl. 364-900.000.

Martz, Donald R.; and Bezjak, Greg W., to Harris Corporation. Self-biasing solid-state T/R switch. 4,979,232, Cl. 455-78.000.

Maruta, Masamichi; and Wada, Tetsuo, to Central Glass Company, Limited. Method of producing 2,2-bis(3-nitro-4-hydroxyphenyl)hexafluoropropane. 4,978,808, Cl. 568-707.000.

Marz, Daniel, to General Instrument Corporation. Up-conversion homodyne receiver for cable television converter with frequency offset to avoid adjacent channel interference. 4,979,230, Cl. 455-3.000.

Masaki, Mitsuo: *See—*
Nohira, Hiroyuki; Masaki, Mitsuo; and Yamamoto, Masao, 4,978,666, Cl. 514-255.000.

Masamoto, Kazuhisa: *See—*
Yagihara, Hiroshi; Goto, Yukihisa; Masamoto, Kazuhisa; Morishima, Yasuo; and Osabe, Hirokazu, 4,978,385, Cl. 71-94.000.

Maschinenfabrik Reinhausen GmbH: *See—*
Berger, Siegbert; Kurz, Karl; and Mayer, Alfred, 4,978,815, Cl. 200-11.0TC.

Masco Corporation: *See—*
Nicklas, James R.; Pullen, Antoinette D.; and Nicklas, James R., 4,978,059, Cl. 236-12.170.

Mashiko, Koichiro: *See—*
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, 4,979,013, Cl. 357-55.000.

Masini, Jean-Jacques; and Collier, Bertrand, to Atochem. Free chlorine removal process. 4,978,435, Cl. 204-157.940.

Massachusetts Institute of Technology: *See—*
Albrecht, Paul; and Cohen, Richard J., 4,979,110, Cl. 364-413.030.
Kelly, John R., 4,978,640, Cl. 501-32.000.
Schreiber, William F., 4,979,041, Cl. 358-141.000.

Masters Cy Industrial Co., Ltd.: *See—*
Wu, Jiin-Chang, 4,978,175, Cl. 301-121.000.

Mastny, Gary F.: *See—*
Lapota, David; Mastny, Gary F.; and Copeland, Hugh D., 4,978,854, Cl. 250-361.00C.

Masubuchi, Takamichi: *See—*
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; Masubuchi, Takamichi; and Sakama, Masao, 4,977,811, Cl. 84-600.000.

Masuda, Fumio: *See—*
Anno, Masahiro; Machida, Junji; Ohtani, Junji; Sano, Eiichi; and Masuda, Fumio, 4,978,595, Cl. 430-106.600.

Masujima, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Offset antenna. 4,978,967, Cl. 343-781.00R.

Masumoto, Takahiko, to Sanyo Electric Co., Ltd. Decoder for subsampled video signal. 4,979,040, Cl. 358-138.000.

Masuoka, Masato: *See—*
Takashige, Masao; Iwai, Teruyuki; Takeichi, Hidenobu; Takai, Yasuo; Sasaki, Yoshinori; Masuoka, Masato; and Ohki, Yuichi, 4,978,484, Cl. 264-40.100.

Materials Technology Corporation, subsidiary of the Carbon/Graphite Group, Inc.: *See—*
Miller, Michael B., 4,978,567, Cl. 428-157.000.

Matrix Pharmaceutical, Inc.: *See—*
Luck, Edward E.; and Brown, Dennis M., 4,978,332, Cl. 604-19.000.

Matros, Jury S.; Zagoruiko, Andrei N.; Malakhova, Irina V.; and Eremin, Oleg G. Process for producing elemental sulphur. 4,978,519, Cl. 423-574.00R.

Matsubara, Akira: *See—*
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

Matsuda, Kenji: *See—*
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.

Matsuda, Morikatsu: *See—*
Umetsu, Masahito; and Matsuda, Morikatsu, 4,978,828, Cl. 219-69.120.

Matsuda, Teruo; Miki, Masayoshi; and Ochi, Hiromu, to Sumitomo Chemical Company, Limited. Descaling of jackets of glass-lined instruments. 4,978,424, Cl. 156-664.000.

Matsuda, Yukimasa: *See—*
Goko, Nobuaki; Uehara, Yumito; Kato, Hideshige; and Matsuda, Yukimasa, 4,978,722, Cl. 525-255.000.

Matsumoto, Akihiko; Nagasawa, Fumihiro; and Onozuka, Kuniharu, to Sony Corporation. Automatic cassette loading and reproducing apparatus. 4,979,057, Cl. 360-71.000.

Matsumoto, Takeshi: *See—*
Akeyoshi, Kazuyuki; Matsumoto, Takeshi; Harada, Satoru; Nakamura, Masatake; and Ishikawa, Toshiyuki, 4,978,812, Cl. 174-35.0MS.

Matsumura, Hiroshi; Oota, Yasato; Matsumura, Tadashi; and Abe, Takayuki, to Tokyo Tatsuno Co., Ltd. Finely pulverized component added in vehicle spray washing water and apparatus for recovering thereof. 4,977,912, Cl. 134-104.400.

Matsumura, Tadashi: *See—*
Matsumura, Hiroshi; Oota, Yasato; Matsumura, Tadashi; and Abe, Takayuki, 4,977,912, Cl. 134-104.400.

Matsuoka, Hiroshi: *See—*
Fujiwara, Akinori; Matsuoka, Hiroshi; Onoe, Susumu; and Kusaka, Kenji, 4,978,409, Cl. 156-315.000.

Matsuoka, Shiro: *See—*
Bair, Harvey E.; and Matsuoka, Shiro, 4,978,712, Cl. 525-51.000.

Matsushima, Hitoshi: *See—*
Ueda, Hirotada; Kato, Kanji; and Matsushima, Hitoshi, 4,979,096, Cl. 364-200.000.

Matsushima, Shunichi: *See—*
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; Masubuchi, Takamichi; and Sakama, Masao, 4,977,811, Cl. 84-600.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Aki, Shinichi; Kobayashi, Masaaki; Muraji, Tsutomu; and Takeuchi, Akihiro, 4,979,046, Cl. 358-330.000.
Hirano, Akihiro; and Hayashi, Seizo, 4,977,640, Cl. 15-339.000.
Kishimoto, Yoshinobu; Ando, Takashi; and Kudo, Harumi, 4,979,061, Cl. 360-96.500.
Matsuta, Toyohiko; Shimotashiro, Masafumi; and Kobayashi, Masaaki, 4,979,052, Cl. 360-32.000.
Mino, Norihisa, 4,978,574, Cl. 428-333.000.
Misaki, Hirozumi; and Okada, Yasuyuki, 4,979,088, Cl. 363-060.000.
Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, 4,979,210, Cl. 380-3.000.

Matsuta, Toyohiko; Shimotashiro, Masafumi; and Kobayashi, Masaaki, to Matsushita Electric Industrial Co., Ltd. Digital signal magnetic recording/reproducing apparatus. 4,979,052, Cl. 360-32.000.

Matsuura, Atsushi; Honda, Kazuo; Inukai, Shinji; and Sano, Hisanori, to Toshiba Lighting & Technology Corporation. Single ended metal vapor discharge lamp with insulating film. 4,978,887, Cl. 313-635.000.

Matsuura, Kazuo: *See—*
Kuroda, Nobuyuki; Kobayashi, Hiroshi; and Matsuura, Kazuo, 4,978,473, Cl. 252-500.000.

Matsuura, Yasuhiro: *See—*
Ohmori, Naoto; Matsuura, Yasuhiro; Hasegawa, Hirofumi; Kojima, Hiroaki; and Yamada, Yukio, 4,978,977, Cl. 346-108.000.

Matthias, Guenther: *See—*
Schmidt-Hellerau, Christof; Weber, Engelbert; and Matthias, Guenther, 4,978,711, Cl. 524-841.000.

Matula, August D.: *See—*
Cueman, Michael K.; Thomas, Lewis J., III; Trzaskos, Casmir R.; Matula, August D.; and Austin, Michael J., 4,979,199, Cl. 378-121.000.

Matumura, Shuji: *See—*
Ito, Michiyasu; Ishii, Toshiyuki; Matumura, Shuji; Mushika, Hajime; and Tanaka, Tomohide, 4,978,486, Cl. 264-41.000.

Maury, Bernard: *See—*
Causse, Pierre; Graham, Peter; Maury, Bernard; and Walter, Jean-Claude, 4,978,880, Cl. 310-324.000.

Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.: *See—*
Liebl, Helmut; and Senetinger, Bertold, 4,978,855, Cl. 250-310.000.

May, Carl J., Jr.: *See—*
Dighe, Rajiv S.; and May, Carl J., Jr., 4,979,165, Cl. 370-60.000.

Mayer, Alfred: *See—*
Berger, Siegbert; Kurz, Karl; and Mayer, Alfred, 4,978,815, Cl. 200-11.0TC.

Maynard, Wade. Tool for removing and installing an automotive universal joint. 4,977,660, Cl. 29-251.000.

Mazda Motor Corporation: *See—*
Edahiro, Takeshi; Kanai, Seita; and Ushio, Kouichi, 4,978,131, Cl. 280-91.000.
Edahiro, Takeshi; Kumada, Hiroyoshi; Morita, Toshiki; Takehara, Shin; and Shibata, Mineharu, 4,978,135, Cl. 280-707.000.
Fukuhara, Keiji, 4,978,290, Cl. 425-147.000.
Hiraoka, Tetsuo; Ohtsuka, Takenori; Hokazono, Kazuaki; Seike, Shinji; and Sunada, Tomohiro, 4,977,865, Cl. 123-52.0MB.
Sekimoto, Isao; and Yasui, Shinichi, 4,977,667, Cl. 29-784.000.
Tomita, Norihiro; Yoshimura, Toshiteru; Kotoh, Masayuki; Ono, Masayosi; Kobayashi, Takayuki; and Monden, Katsunori, 4,978,136, Cl. 280-751.000.

Mazieres, Philippe: *See—*
Grenier, Maurice; and Mazieres, Philippe, 4,977,746, Cl. 62-22.000.

McAuley, Kenneth A.; and Silveira, Frank S., to Polaroid Corporation. Pick mechanism for sheet feeding apparatus. 4,978,113, Cl. 271-10.000.

McBride, Stephen W., to H-C Industries, Inc. Tamper-indicating plastic closure. 4,978,017, Cl. 215-252.000.

McClain, Christopher G.: *See—*
Baum, David M.; Bradshaw, Andrea E.; and McClain, Christopher G., 4,979,207, Cl. 379-112.000.

McClintic, Mark S.: *See—*
Allen, Dennis; Del Fava, Donald; Geesey, Harold D.; Koht, Lowell I.; McClintic, Mark S.; Newton, Dean A.; and Petro, Timothy L., Sr., 4,978,194, Cl. 350-96.230.

McClung, James A.: *See—*
Bulso, Joseph D., Jr.; and McClung, James A., 4,977,772, Cl. 72-336.000.

McCool, John F., to Advanced Micro Devices, Inc. Methods and apparatus for performing restricted token operations on an FDDI network. 4,979,167, Cl. 370-85.400.

McCraw, Clarence L., to Columbus McKinnon Corporation. Cam assisted load binder. 4,977,646, Cl. 24-68.0CD.

McCraw, Earl C., Jr.: *See—*
Janssen, Robert A.; McCraw, Earl C., Jr.; and Nicholson, Paul C., 4,978,481, Cl. 264-1.400.

McCray, Scott B., to Bend Research, Inc. P-xylylenediamide/diimide composite RO membranes. 4,978,455, Cl. 210-654.000.

McCullough, Francis P., Jr., to Dow Chemical Company, The. Process and apparatus for crimping fibers. 4,977,654, Cl. 28-278.000.

McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., to Dow Chemical Company, The. Carbonaceous fiber or fiber assembly with inorganic coating. 4,978,571, Cl. 428-263.000.

McCullough, Robert B.; Taylor, Robert G., Jr.; Stark, Glenn M.; Swinton, William G.; and Fairman, Bruce A., to Tandon Corporation. Disk drive for storing data in run length limited format and method of providing such format. 4,979,054, Cl. 360-48.000.

McFay, Dennis J.: *See—*
Brown, Sterling B.; McFay, Dennis J.; Yates, John B., III; and Lee, Gim F., 4,978,715, Cl. 525-92.000.

McGahren, William J.: *See—*
Ellestad, George A.; and McGahren, William J., 4,978,748, Cl. 536-17.500.

McGarvey, John A.: *See—*
Beausoleil, Raymond G.; Hagman, Ronald L.; and McGarvey, John A., 4,979,178, Cl. 372-20.000.

McKee, Randy: *See—*
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.

McKenzie, Jeffrey J.: *See—*
Chinnock, Robert T.; and McKenzie, Jeffrey J., 4,977,929, Cl. 137-863.000.

McKenzie, Joseph A., Jr., to McKenzie Technology, Inc. Method of making socket connector. 4,977,668, Cl. 29-852.000.

McKenzie Technology, Inc.: *See—*
McKenzie, Joseph A., Jr., 4,977,668, Cl. 29-852.000.

McLafferty, Fred W.: *See—*
Williams, Evan R.; and McLafferty, Fred W., 4,978,852, Cl. 250-282.000.

McMennamy, John A.: *See—*
Nafziger, Steven; and McMennamy, John A., 4,977,778, Cl. 73-597.000.

McNair, Jerry R.: *See—*
Daugherty, Paul R.; McNair, Jerry R.; and O'Donnell, Patrick F., 4,978,485, Cl. 264-40.200.

McNelis, Barbara J.: *See—*
Buller, Marvin L.; McNelis, Barbara J.; and Snyder, Campbell H., 4,978,638, Cl. 437-209.000.

McVey, Carl, to RWO (Marine Equipment) Limited. Relating to a ratchet machanism. 4,977,795, Cl. 74-575.000.

McVie, James: *See—*
Cray, Stephen E.; McVie, James; and Yianni, Paul A., 4,978,561, Cl. 427-387.000.

McWilliams, Dennis M., to Eaton Corporation. Reversible poppet valve cartridge with single piece stem. 4,977,922, Cl. 137-269.000.

Mead Corporation, The: *See—*
Stone, Benjamin C., 4,978,560, Cl. 427-366.000.

Measurex Corporation: *See—*
Boissevain, Mathew G., 4,977,687, Cl. 34-51.000.

Meath, Donald L.: *See—*
Wiley, Roy O.; Meath, Donald L.; and Murphy, Glenn L., 4,978,318, Cl. 439-536.000.

Mecron medizinische Prrdukte GmbH: *See—*
Goymann, Volkmar; Anapliotis, Emmanuel; and Kranz, Curt, 4,978,357, Cl. 623-18.000.

Medex, Inc.: *See—*
Arthur, William D., III, 4,978,335, Cl. 604-67.000.

Medical Foundation of Buffalo, Inc.: *See—*
Osawa, Yoshio, 4,978,658, Cl. 514-178.000.

Mediolanum Farmaceutici S.r.l. Consiglio Nazionale Delle Ricerch: *See—*
Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., 4,978,673, Cl. 514-411.000.

Mehr, Lothar: *See—*
Stohr, Hans; and Mehr, Lothar, 4,977,782, Cl. 73-862.290.

Mehta, Kapil: *See—*
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Mehta, Mayur H., to Advanced Micro Devices, Inc. Method and apparatus for testing a binary counter. 4,979,193, Cl. 377-29.000.

Mehta, Reeta: *See—*
Lopez-Berestein, Gabriel; Fainstein, Victor; Hersh, Evan M.; Hopfer, Roy L.; Juliano, Rudolph L.; Mehta, Kapil; and Mehta, Reeta, 4,978,654, Cl. 514-31.000.

Meierling, Peter, to Krupp Industrietechnik GmbH. Steel mill system which includes a metallurgical furnace and a further processing system. 4,978,105, Cl. 266-143.000.

Meijer, Henricus E. H.: *See—*
Kersemakers, Jozef J. F. M.; Meijer, Henricus E. H.; and Martens, Gerardus, 4,978,493, Cl. 264-255.000.

Meijer, Roelf J., to Stirling Thermal Motors, Inc. Stirling engine with integrated gas combustor. 4,977,742, Cl. 60-525.000.

Meixler, Lewis D.: *See—*
Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., 4,979,203, Cl. 378-206.000.

Meixner, Erwin: *See—*
Leisinger, Roger; and Meixner, Erwin, 4,977,969, Cl. 177-50.000.

Melancon, Kurt C.; and Tiers, George V. D., to Minnesota Mining and Manufacturing Company. Process for fluorimetric monitoring of functional coatings and compositions and fluorescent agents therefor. 4,978,731, Cl. 528-15.000.

Meldrum, John A. D.: *See—*
Perry, Phillip J.; Meldrum, John A. D.; Metlikovec, Jordon; Bauer, Michael J.; and White, Clive S., 4,978,911, Cl. 324-142.000.

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Mendoza, Abel, to Dow Chemical Company, The. Meta-halogenated dibenzylphenols. 4,978,809, Cl. 568-720.000.

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Kleefeldt, Frank; Menke, Johannes T.; and Kostler, Ulrich, 4,978,154, Cl. 292-201.000.

Menon, Krishna S.; and Beck, Rodger W., to Eastman Kodak Company. Reverse osmosis water purification system for producing carbonated water. 4,978,550, Cl. 426-549.000.

Menzel, Stanley W. O., to Rib Loc Australia Pty. Ltd. Method of producing reinfored ribbed tubes. 4,977,931, Cl. 138-154.000.

Mercedes-Benz AG: *See—*
Andres, Rudolf; Knoll, Heinz; Pfistner, Harald; and Petri, Voker, 4,978,139, Cl. 280-805.000.

Merck & Co., Inc.: *See—*
Blizzard, Timothy A.; Mrozik, Helmut; Marino, Gaye; and Sinclair, Peter J., 4,978,656, Cl. 514-63.000.
DiNinno, Frank P.; Muthard, David A.; and Salzmann, Thomas N., 4,978,659, Cl. 514-210.000.
Rupprecht, Kathleen M.; and Boger, Joshua S., 4,978,679, Cl. 514-468.000.
Saperstein, Richard; Tolman, Richard L.; and Slater, Eve E., 4,978,667, Cl. 514-258.000.

Mercolino, Thomas J.: *See—*
Wagner, Daniel B.; Vonk, Glenn P.; and Mercolino, Thomas J., 4,978,625, Cl. 436-518.000.

Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., to Mediolanum Farmaceutici S.r.l. Consiglio Nazionale Delle Ricerch. Organic salts of physostigmine derivatives. 4,978,673, Cl. 514-411.000.

Merrison, John C.; DeLange, Robert J.; and Rowan, Timothy M., to Allen-Bradley Company, Inc. Motor controller with an improved stopping technique. 4,978,897, Cl. 318-268.000.

Mesica, Zuri; and Golan, Igal, to Prestige Collection, Inc. Jewlery with rotatable ornamentation. 4,977,757, Cl. 63-15.000.

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Sepp, Gunther, 4,978,221, Cl. 356-4.000.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Berresheim, Alexander, 4,978,956, Cl. 341-155.000.

Messina, Giuseppe; Sechi, Giovanni; Lorenzoni, Loreno; and Bruzzi, Vittorio, to Enichem Anic S.p.A. Chemical process for the preparation of oxamide derivatives and compounds prepared thereby. 4,978,786, Cl. 564-160.000.

Metcalf, Jeffrey D., to Roadmaster Corporation. Flywheel. 4,977,794, Cl. 74-572.000.

Metcalfe, Frederick S., deceased. Modular room air conditioner and method for making same. 4,977,750, Cl. 62-77.000.

Metcalfe, Richard T.; and Salce, Arthur J., to American Optical Corporation. Protective goggle. 4,977,627, Cl. 2-437.000.

Metlikovec, Jordon: *See—*
Perry, Phillip J.; Meldrum, John A. D.; Metlikovec, Jordon; Bauer, Michael J.; and White, Clive S., 4,978,911, Cl. 324-142.000.

Mettler Instrumente AG: *See—*
Leisinger, Roger; and Meixner, Erwin, 4,977,969, Cl. 177-50.000.

Metzger, Herbert: *See—*
Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, 4,978,108, Cl. 266-220.000.

Meyer, Daniel F.: *See—*
Vincent, Gary A.; and Meyer, Daniel F., 4,978,694, Cl. 523-173.000.

Meyer, Robert J.: *See—*
Frankel, Neil A.; Lindblad, Nero R.; Relyea, Herbert C.; and Meyer, Robert J., 4,978,999, Cl. 355-299.000.

Meyer, Willy: *See—*
Gass, Erfinders K.; Fory, Werner; Meyer, Willy; and Topfl, Werner, 4,978,383, Cl. 71-93.000.

Meyers, Jonathan H. Apparatus for mounting clips and fixture therefor. 4,978,012, Cl. 211-49.100.

Meyman, Usher. Automatic umbrella. 4,977,913, Cl. 135-24.000.

Michel, Jean-Marc: *See—*
Biton, Jacques; Gellf, Gerard; Michel, Jean-Marc; Paul, Francois B.; and Monsan, Pierre F., 4,978,751, Cl. 536-123.000.

Micrel Incorporated: *See—*
Alter, Martin J., 4,979,001, Cl. 357-13.000.

Microelectronics and Computer Technology Corporation: *See—*
Luijtjes, Nicolaas G.; Galanakis, Claire T.; and Whalen, Barry H., 4,978,835, Cl. 219-121.640.

Micron Technology, Inc.: *See—*
Chapman, Gregory M., 4,977,993, Cl. 193-45.000.

Microsonic, Inc.: *See—*
Major, Miklos, 4,977,976, Cl. 181-130.000.

Middeldorp, Derk J., to Thomassen & Drijver-Verblifa N.V. Device for ejecting wrongly oriented covers from a continuous flow. 4,977,998, Cl. 198-395.000.

Mihara, Hiroshi: *See—*
Ohmi, Tadahiro; Mihara, Hiroshi; and Satoh, Kiyoshi, 4,977,916, Cl. 137-8.000.

Mihayashi, Keiji: *See—*
Ohki, Nobutaka; Mihayashi, Keiji; Nakamura, Shigeru; and Fukuzawa, Hiroshi, 4,978,606, Cl. 430-505.000.

Mii, Adam. Semiconductor element string structure. 4,979,017, Cl. 357-70.000.

Miike, Akira: *See—*
Aoyama, Norihito; Miike, Akira; Shimizu, Yoshiaki; and Tatano, Toshio, 4,978,615, Cl. 435-25.000.

Mikhail, Ameer G. Postal stamp, process, apparatus, and metering device, thereof. 4,978,145, Cl. 283-71.000.

Miki, Masayoshi: *See—*
Matsuda, Teruo; Miki, Masayoshi; and Ochi, Hiromu, 4,978,424, Cl. 156-664.000.

Mildenberger, Hilmar: *See—*
Schlegel, Gunter; and Mildenberger, Hilmar, 4,978,774, Cl. 560-53.000.

Milia, Andrew; and Bahr, Richard G., to Apollo Computer Inc. Quasi-fair arbitration scheme with default owner speedup. 4,979,099, Cl. 364-200.000.

Miller, Christopher G.: *See—*
Schwarzschild, Jack; Uphoff, Russel L.; and Miller, Christopher G., 4,977,898, Cl. 128-662.060.

Miller, David A. B.: *See—*
Hinton, Harvard S.; Lentine, Anthony L.; and Miller, David A. B., 4,978,842, Cl. 250-213.00A.
Knox, Wayne H.; and Miller, David A. B., 4,978,910, Cl. 324-96.000.

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Miller, Robert R., II: *See—*
Erving, Richard H.; Ford, William A.; and Miller, Robert R., II, 4,979,163, Cl. 370-32.100.

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Miller, Steven A.: *See—*
Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,978,039, Cl. 222-592.000.

Miller, William R., to Rembrandt Photo Services. Reinforced pocket structure for thermo-adhesive materials. 4,978,055, Cl. 229-72.000.

Millerick, Michael A.; and Patterson, Michael W., to National Semiconductor Corporation. Laser trimming system for semiconductor integrated circuit chip packages. 4,978,830, Cl. 219-121.670.

Milleson, Joseph P., to APV Crepaco, Inc. Apparatus for filling cases with a plurality of articles arranged in a predetermined pattern. 4,977,727, Cl. 53-543.000.

Milliken Research Corporation: *See—*
Kluger, Edward W.; and Rekers, John W., 4,978,362, Cl. 18-506.000.

Mine, Atsushi: *See—*
Hiwatashi, Yutaka; Kamimura, Katsuyoshi; and Mine, Atsushi, 4,978,848, Cl. 250-231.160.

Minematsu, Toru; and Nagayama, Haruki, to Sony Corporation. Video telephone. 4,979,028, Cl. 358-85.000.

Minemura, Hiroyuki; Sato, Yoshio; Tsuboi, Nobuyoshi; Koyanagi, Hiroaki; and Ohyama, Shinji, to Hitachi, Ltd. Optical element, optical disc and rotary encoder with the optical element. 4,978,187, Cl. 350-96.110.

Mini, Anna M.; and Vandenbroeck, Patrick G. Collapsible container. 4,978,021, Cl. 220-8.000.

Minister of Agriculture, Fisheries & Food, etc.: *See—*
Diprose, Michael F.; and Evans, Geoffrey H., 4,978,501, Cl. 422-22.000.

Ministry of International Trade & Industry: *See—*
Kajiwara, Shigeru; Maeda, Hidekatsu; and Suzuki, Hideo, 4,978,619, Cl. 435-182.000.

Minnesota Mining and Manufacturing Company: *See—*
Brink, Robert H.; and Tseng, Chi-Ming, 4,978,527, Cl. 424-78.000.
Carpenter, Robert S.; Rodriguez, Ernesto M.; and Roden, Dennis J., 4,978,218, Cl. 353-119.000.
Elmasry, Mohamed A.; and Kidnie, Kevin M., 4,978,598, Cl. 430-137.000.
Jacobs, Dwight W.; and Crowe, Gregory D., 4,978,007, Cl. 206-469.000.
Melancon, Kurt C.; and Tiers, George V. D., 4,978,731, Cl. 528-15.000.
Ofstead, Ronald F., 4,977,901, Cl. 128-772.000.
Pesce, Sergio, 4,978,599, Cl. 430-139.000.

Mino, Norihisa, to Matsushita Electric Industrial Co., Ltd. Formation of organic membranes. 4,978,574, Cl. 428-333.000.

Minolta Camera Kabushiki Kaisha: *See—*
Anno, Masahiro; Machida, Junji; Ohtani, Junji; Sano, Eiichi; and Masuda, Fumio, 4,978,595, Cl. 430-106.600.
Arima, Jiro; and Tsujimura, Hiroji, 4,979,133, Cl. 364-557.000.
Arima, Jiro; Tsujimura, Hiroji; Narita, Tomonori; and Takebuchi, Hiroki, 4,979,134, Cl. 364-557.000.
Ishikawa, Norio; Nakai, Masaaki; and Inoue, Manabu, 4,978,982, Cl. 354-21.000.
Karasaki, Toshihiko, 4,978,988, Cl. 354-406.000.
Katoh, Osami; and Kusano, Hideaki, 4,978,215, Cl. 353-26.00R.
Kusumoto, Keiji; Kawaguchi, Toshikazu; and Nagata, Kenzo, 4,978,992, Cl. 355-51.000.
Moriya, Shigeru; and Nakatani, Keiji, 4,978,226, Cl. 358-76.000.
Mukai, Hiromu; and Nakai, Etsuko, 4,978,199, Cl. 350-286.000.
Ohmori, Naoto; Matsuura, Yasuhiro; Hasegawa, Hirofumi; Kojima, Hiroaki; and Yamada, Yukio, 4,978,977, Cl. 346-108.000.
Taniguchi, Nobuyuki; Karasaki, Toshihiko; Ishida, Tokuji; Hamada, Masataka; and Norita, Toshio, 4,979,045, Cl. 358-227.000.
Tsuboi, Toshio; Nakatani, Keiji; and Moriya, Shigeru, 4,979,031, Cl. 358-75.000.

Minter, William D. Uneven terrain riding tractor mower. 4,977,732, Cl. 56-11.400.

Mintz, Gilbert R.: *See—*
Gesslein, Bruce W.; Guth, Jacob J.; Mintz, Gilbert R.; Reinhart, Gale M.; and Smith, Laurence R., 4,978,526, Cl. 424-70.000.

Miranol, Inc.: *See—*
Nadolsky, Richard J., 4,978,781, Cl. 562-102.000.

Misaki, Atsushi; Kono, Masao; Ogawa, Michio; and Okamoto, Mitsuhiro, to Shionogi & Co., Ltd. Monoclonal antibody specific to human pancreatic phospholipase A_2. 4,978,609, Cl. 435-7.000.

Misaki, Hirozumi; and Okada, Yasuyuki, to Matsushita Electric Industrial Co., Ltd. Integrated high voltage generating system. 4,979,088, Cl. 363-060.000.

Misawa, Takeshi; and Sawachi, Youichi, to Fuji Photo Film Co., Ltd. Vertical contour enhancement suppression circuit. 4,979,024, Cl. 358-37.000.

Mishell, Robert; and Usinger, William, to University of California, Regents of the. Cytophaga-derived immunopotentiator. 4,978,622, Cl. 435-274.000.

Mishima, Tadahiko: *See—*
Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, 4,978,588, Cl. 204-192.310.

Misubishi Denki Kabushiki Kaisha: *See—*
Sengoku, Masaharu, 4,979,059, Cl. 360-78.090.

Misumi, Masao; and Atsumi, Koji, to Oval Engineering Co., Ltd. Vortex flow meter. 4,977,781, Cl. 73-861.220.

Mitani, Akio: *See—*
Yamagishi, Katsuaki; Kashima, Koji; Mitani, Akio; and Shimura, Masatoshi, 4,977,953, Cl. 165-10.000.

Mitani, Katsuhiko: *See—*
Kusano, Chushiro; Tanoue, Tomonori; and Mitani, Katsuhiko, 4,979,009, Cl. 357-34.000.

Mitchell, Allan T., to Texas Instruments Incorporated. Floating-gate memory cell with tailored doping profile. 4,979,005, Cl. 357-235.000.

Mitchell, Allan T.: *See—*
Esquivel, Agerico L.; Mitchell, Allan T.; and Tigelaar, Howard L., 4,979,004, Cl. 357-23.500.

Mito, Yoshiki; Sueda, Minoru; Shiota, Hiroshi; and Tashiro, Shozo, to Mitsubishi Jukogyo Kabushiki Kaisha. Double action die set for closed forging. 4,977,773, Cl. 72-353.600.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, 4,979,013, Cl. 357-55.000.

Hirai, Hayao, 4,978,901, Cl. 318-600.000.
Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, 4,978,962, Cl. 342-351.000.
Ida, Masakatsu; and Morishita, Arkira, 4,978,864, Cl. 290-48.000.
Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, 4,978,874, Cl. 310-83.000.
Koiwa, Mitsuru, 4,977,883, Cl. 123-644.000.
Komori, Shigeki; and Tsukamoto, Katsuhiro, 4,978,629, Cl. 437-41.000.
Komurasaki, Satoshi, 4,978,883, Cl. 310-329.000.
Masujima, Toshio, 4,978,967, Cl. 343-781.00R.
Mizuta, Masaharu, 4,979,144, Cl. 364-900.000.
Okamoto, Kyoichi, 4,978,875, Cl. 310-88.000.
Sakai, Yozo, 4,978,827, Cl. 219-69.110.
Sakamoto, Hidenobu, 4,978,918, Cl. 324-309.000.
Takahashi, Yutaka; Noguchi, Yoshihiro; Yanagida, Takahiro; and Imai, Tomohisa, 4,977,639, Cl. 15-319.000.
Watanabe, Jinzo, 4,978,635, Cl. 437-52.000.

Mitsubishi Electric Home Appliance Co., Ltd.: *See—*
Takahashi, Yutaka; Noguchi, Yoshihiro; Yanagida, Takahiro; and Imai, Tomohisa, 4,977,639, Cl. 15-319.000.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Isshiki, Tomiya; Kijima, Yasuhiko; Ito, Akiro; Miyauchi, Yuh; Konko, Takao; and Watanabe, Takayuki, 4,978,778, Cl. 560-261.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Mito, Yoshiki; Sueda, Minoru; Shiota, Hiroshi; and Tashiro, Shozo, 4,977,773, Cl. 72-353.600.

Mitsubishi Kasei Corporation: *See—*
Goko, Nobuaki; Uehara, Yumito; Kato, Hideshige; and Matsuda, Yukimasa, 4,978,722, Cl. 525-255.000.
Wada, Keisuke; and Tsurita, Yasushi, 4,978,641, Cl. 501-39.000.

Mitsubishi Mining and Cement Co. Ltd.: *See—*
Ito, Takaaki; Uchida, Akio; and Ikeda, Hiroyuki, 4,979,071, Cl. 361-56.000.

Mitsubishi Pencil Co., Ltd.: *See—*
Konose, Yoshiomi, 4,978,242, Cl. 401-129.000.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Kanayama, Kaoru; and Ichikawa, Shuji, 4,978,810, Cl. 568-720.000.

Mitsui, Fumito: *See—*
Kurokawa, Toru; Watanabe, Hiroyuki; Tanaka, Shoichi; and Mitsui, Fumito, 4,978,552, Cl. 426-559.000.

Mitsui Petrochemical Industries, Ltd.: *See—*
Tanaka, Mutsuhiro; and Honma, Shiro, 4,978,707, Cl. 524-504.000.

Mitsui Toatsu Chemicals, Inc.: *See—*
Ezawa, Hiroshi; Nakakura, Toshiyuki; Watanabe, Takayuki; and Tsushima, Hiroaki, 4,978,692, Cl. 521-185.000.
Hoshino, Futoshi; Nakano, Makoto; and Yanagihara, Takeshi, 4,978,695, Cl. 523-201.000.
Ibi, Akira; Kitagawa, Masanori; Sagawa, Eiichi; Takeuchi, Koichi; and Ohkawado, Etsuo, 4,978,754, Cl. 544-176.000.
Ito, Michiyasu; Ishii, Toshiyuki; Matumura, Shuji; Mushika, Hajime; and Tanaka, Tomohide, 4,978,486, Cl. 264-41.000.
Morii, Mitsuyoshi; Ohoka, Masaharu; Suzuki, Toshihiko; Suzuki, Katsuyuki; Kawashima, Nobuhiro; Morii, Noriko; and Mori, Kunizo, 4,978,620, Cl. 435-226.000.
Nagata, Teruyuki; Tamaki, Akihiro; Watanabe, Katsuzi; and Yamaguchi, Akihiro, 4,978,792, Cl. 564-384.000.

Mittelbach, Helmut; Mueller, Xaver; and Schlegel, Peter, to Computer Gesellschaft Konstanz mbH. Method for automatic character recognition employing a lexicon having updated character strings. 4,979,227, Cl. 382-40.000.

Mittelman, Philippe: *See—*
Frejaville, Serge; Mittelman, Philippe; Rajaonarivello, Claude; and Naud, Jean-Michel, 4,977,747, Cl. 62-50.100.

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Dieudonne, Walter; Mittelstadt, Norbert; and Reul, Kurt, 4,978,836, Cl. 219-388.000.

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Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

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Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, 4,978,472, Cl. 252-301.40H.

Miyabe, Noriji, to Jujo Paper Co., Ltd. Waste paper de-inking process using multi-stage vertical column vapor-liquid mixer. 4,977,943, Cl. 162-4.000.

Miyahara, Shuji; Kimuro, Harumi; and Yamashita, Saburo, to Shikawajima-Harima Jukogyo Kabushi Kaisha. Cleaning method for apparatus. 4,977,910, Cl. 134-7.000.

Miyake, Junichi: *See—*
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 4,977,797, Cl. 74-866.000.

Miyamoto, Mitsuaki: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, to Hitachi, Ltd.; and Hitachi Device Engineering Co., Ltd. Electron gun for use in color cathode ray tube having a plurality of grid electrodes. 4,978,886, Cl. 313-414.000.

Miyao, Takashi: *See—*
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Sato, Hiroshi; and Miyauchi, Yoshiaki, 4,978,238, Cl. 400-124.000.

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Isshiki, Tomiya; Kijima, Yasuhiko; Ito, Akiro; Miyauchi, Yuh; Konko, Takao; and Watanabe, Takayuki, 4,978,778, Cl. 560-261.000.

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Motohashi, Nobutsuna; Kitauchi, Fukumitsu; and Miyawaki, Nobuyuki, 4,978,237, Cl. 384-580.000.

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Nakamura, Katsumi; Miyazaki, Kenichi; Hagiwara, Taro; and Kuriyama, Hiroshi, 4,978,164, Cl. 296-197.000.

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Segerstad, Sverker H. A.; Carlsson, Charlotte; and Mizeraczyk, Jerzy, 4,979,179, Cl. 372-88.000.

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Takagawa, Ryozo; Tanabe, Hisaki; Asakura, Koji; Yamada, Mitsuo; Ohsugi, Hiroharu; Mizuguchi, Ryuzo; and Eguchi, Yoshio, 4,978,777, Cl. 560-224.000.

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Mizuno, Kuniharu: *See—*
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Mizuno, Shinji: *See—*
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Maeda, Yoshiharu; Mizuno, Yukio; Nakatani, Akira; and Yamano, Mitsuhisa, 4,978,752, Cl. 540-222.000.

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Kawata, Toshihiko; Mizuta, Ken; and Fukuda, Kazuaki, 4,979,066, Cl. 361-10.000.

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Kutchenriter, Kevin W.; and Moga, Leo J., 4,978,223, Cl. 356-384.000.

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Sprague, Sherman J., 4,978,456, Cl. 210-699.000.

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Kotzin, Michael D.; van den Heuvel, Anthony P.; Crisler, Kenneth J.; Hiben, Bradley M.; Mohl, Lawrence M.; and Poulin, Mark R., 4,979,188, Cl. 375-34.000.

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Biton, Jacques; Gellf, Gerard; Michel, Jean-Marc; Paul, Francois B.; and Monsan, Pierre F., 4,978,751, Cl. 536-123.000.

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Chaplin, John B.; Moore, Robert G.; and Ryken, John M., 4,978,320, Cl. 440-052.000.
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Bush, Gregory F.; Keener, Don S.; Morel, Jeanne E.; and Voorhees, Richard W., 4,979,148, Cl. 365-230.010.
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Shimizu, Ryuichi; Kawanishi, Tsuneaki; Suzuki, Shigeo; Hosaka, Shigeo; Mori, Yasuki; and Narahara, Toshikazu, 4,978,596, Cl. 430-109.000.
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Hattori, Toshihiro; Ishihara, Masaki; Kasai, Hitoshi; and Moride, Shigeki, 4,979,117, Cl. 364-431.070.
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Kishimoto, Shin; Morimoto, Toshihide; Nobuaki, Kakimori; Takahashi, Yuho; and Ohsaki, Morihide, 4,978,224, Cl. 356-394.000.
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Ida, Masakatsu; and Morishita, Arkira, 4,978,864, Cl. 290-48.000.
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Haga, Toru; Nagano, Eiki; Sato, Ryo; and Morita, Kouichi, 4,978,787, Cl. 564-218.000.
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Yagi, Nobuyuki; Inagaki, Jiroh; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,978,491, Cl. 264-154.000.
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Edahiro, Takeshi; Kumada, Hiroyoshi; Morita, Toshiki; Takehara, Shin; and Shibata, Mineharu, 4,978,135, Cl. 280-707.000.
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Yuyama, Masahiro; Moritani, Masahiko; and Futagami, Mikio, 4,978,702, Cl. 524-266.000.
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Shibuya, Kiyoshi; Sato, Toru; Morito, Nobuyuki; Nara, Seiko; and Hiramatsu, Teruo, 4,977,949, Cl. 164-417.000.
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Durnwirth, Roy K., Jr.; George, John E.; and Morton, Kim L., 4,978,423, Cl. 156-659.100.
Moscow: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.
Moser, Franz: *See*—
Engel, Walter; Moser, Franz; and Sigrist, Hugo, 4,977,657, Cl. 29-1.210.
Moskovsky Geologorazvedochny Institut Imeni Sergo Ordzhonikidze: *See*—
Drobadenko, Valery P.; and Lukonina, Olga A., 4,978,251, Cl. 406-50.000.
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Hausman, Kristen A.; Gaudenzi, Gene J.; Mosley, Joseph M.; and Tempest, Susan L., 4,978,927, Cl. 331-57.000.
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Nakanose, Megumi; Koyama, Naoyuki; Aoshiba, Mitsunori; and Motegi, Tadao, 4,979,181, Cl. 372-98.000.
Motohashi, Mitsuo: *See*—
Hamada, Jun-ichi; Itaya, Masahiko; and Motohashi, Mitsuo, 4,979,000, Cl. 355-315.000.
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Suzuki, Masahiro; and Motoori, Ryuzo, 4,979,043, Cl. 358-167.000.
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Remington, Scott; and Martino, William L., Jr., 4,979,145, Cl. 364-900.000.
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Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 4,979,114, Cl. 364-424.050.
Movats Incorporated: *See*—
Nafziger, Steven; and McMennamy, John A., 4,977,778, Cl. 73-597.000.
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Moreland, Jack, 4,977,662, Cl. 24-389.000.

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Mainiero, John W.; Mainiero, Michael R.; and Heinlein, Thomas J., 4,978,943, Cl. 340-566.000.

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Ostertag, Werner; and Mronga, Norbert, 4,978,394, Cl. 106-404.000.

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Blizzard, Timothy A.; Mrozik, Helmut; Marino, Gaye; and Sinclair, Peter J., 4,978,656, Cl. 514-63.000.

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Vora, Rohitkumar H.; and Mueller, Werner H., 4,978,742, Cl. 528-353.000.

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Mittelbach, Helmut; Mueller, Xaver; and Schlegel, Peter, 4,979,227, Cl. 382-40.000.

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Durkee, William D., Jr.; and Muller, Philip J., 4,977,935, Cl. 141-99.000.

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Fuchs, Karlheinz; and Munch, Norbert, 4,978,361, Cl. 8-94.270.

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Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., 4,979,100, Cl. 364-200.000.

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Okubo, Hiromi; Itoh, Takanori; and Murai, Kazuo, 4,979,129, Cl. 364-518.000.

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Aki, Shinichi; Kobayashi, Masaaki; Muraji, Tsutomu; and Takeuchi, Akihiro, 4,979,046, Cl. 358-330.000.

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Murata Manufacturing Co., Ltd.: *See*—
Hamuro, Mitsuroh; Hata, Yoshitaka; Hayashi, Shigeo; and Takahashi, Akihiko, 4,978,913, Cl. 324-158.00F.
Kawahata, Kazunari, 4,979,233, Cl. 455-330.000.

Murata, Moriyasu: *See*—
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.
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Mushika, Hajime: *See*—
Ito, Michiyasu; Ishii, Toshiyuki; Matumura, Shuji; Mushika, Hajime; and Tanaka, Tomohide, 4,978,486, Cl. 264-41.000.

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DiNinno, Frank P.; Muthard, David A.; and Salzmann, Thomas N., 4,978,659, Cl. 514-210.000.

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Altizer, Eugene E., 4,977,673, Cl. 30-294.000.

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Kinyon, Larry R., 4,978,403, Cl. 156-97.000.

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Nada Electronics Limited: *See*—
Gurwicz, David, 4,978,829, Cl. 219-69.130.

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Barchas, Jack D.; Elliott, Glen R.; Adriaenssens, Peter I.; Bitner, Robert S.; Bowersox, Stephen S.; and Nadasdi, Laszlo, 4,978,669, Cl. 514-292.000.

Nadolsky, Richard J., to Miranol, Inc. Low-foam alkali-stable amphoteric surface active agents. 4,978,781, Cl. 562-102.000.

Nafziger, Steven; and McMennamy, John A., to Movats Incorporated. Check valve testing system. 4,977,778, Cl. 73-597.000.

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Kung, Viola T.; and Nagainis, Peter A., 4,978,608, Cl. 435-6.000.

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Haga, Toru; Nagano, Eiki; Sato, Ryo; and Morita, Kouichi, 4,978,787, Cl. 564-218.000.

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Adachi, Masaharu; Uematsu, Yoshiaki; Nagano, Haruo; and Yamada, Koji, 4,977,994, Cl. 194-210.000.

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Matsumoto, Akihiko; Nagasawa, Fumihiro; and Onozuka, Kuniharu, 4,979,057, Cl. 360-71.000.

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Minematsu, Toru; and Nagayama, Haruki, 4,979,028, Cl. 358-85.000.

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Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, 4,978,740, Cl. 528-272.000.

Naito, Kinshiro, to Amada Company, Limited. Punch press. 4,977,804, Cl. 83-76.700.

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Iwano, Haruhiko; and Nakagawa, Fumio, 4,978,433, Cl. 204-92.000.

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Uehara, Masao; Sasagawa, Katsuyoshi; Yamashita, Shinji; Sasaki, Masahiko; Saito, Katsuyuki; Kanoo, Masahide; Uchikubo, Akinobu; Nakagawa, Takehiro; and Hasegawa, Jun, 4,979,035, Cl. 358-98.000.

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Haraguchi, Shinya; and Nakahara, Kiyonori, 4,979,205, Cl. 379-61.000.

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Suzuki, Tomonari; Wada, Hiroshi; Yoshimoto, Yoshikazu; Yoshida, Masaru; and Nakajima, Shigeo, 4,978,600, Cl. 429-218.000.

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Ezawa, Hiroshi; Nakakura, Toshiyuki; Watanabe, Takayuki; and Tsushima, Hiroaki, 4,978,692, Cl. 521-185.000.

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Shimamune, Takayuki; Nishiki, Yoshinori; and Nakamatsu, Shuji, 4,978,438, Cl. 204-265.000.

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Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

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Kai, Hisao; and Nakashima, Kiyoshi, 4,977,807, Cl. 83-676.000.
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Maeda, Yoshiharu; Mizuno, Yukio; Nakatani, Akira; and Yamano, Mitsuhisa, 4,978,752, Cl. 540-222.000.
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Moriya, Shigeru; and Nakatani, Keiji, 4,978,226, Cl. 358-76.000.
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Shibuya, Kiyoshi; Sato, Toru; Morito, Nobuyuki; Nara, Seiko; and Hiramatsu, Teruo, 4,977,949, Cl. 164-417.000.
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Shimizu, Ryuichi; Kawanishi, Tsuneaki; Suzuki, Shigeo; Hosaka, Shigeo; Mori, Yasuki; and Narahara, Toshikazu, 4,978,596, Cl. 430-109.000.
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Arima, Jiro; Tsujimura, Hiroji; Narita, Tomonori; and Takebuchi, Hiroki, 4,979,134, Cl. 364-557.000.
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Heyn, Hans E.; and Narramore, Russell H., 4,978,570, Cl. 428-231.000.
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Roos, Charles E.; and Quarles, Ronald A., 4,977,837, Cl. 110-165.00A.
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Sheh, Leung, 4,978,783, Cl. 562-431.000.
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Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, 4,978,962, Cl. 342-351.000.
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Frejaville, Serge; Mittelman, Philippe; Rajaonarivello, Claude; and Naud, Jean-Michel, 4,977,747, Cl. 62-50.100.
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Hosoda, Kenji; Suzuki, Hideaki; Kubota, Takaharu; and Nawata, Kiyoshi, 4,978,611, Cl. 435-7.000.
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Boswell, Peter; Negaty-Hindi, Guy; and Berce, Tatiana, 4,977,947, Cl. 164-71.100.
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Hotta, Masao; Shimizu, Toshihiko; and Nejime, Yoshito, 4,978,957, Cl. 341-156.000.
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Kalina, Vladimir, 4,978,618, Cl. 435-162.000.
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Burford, Russell L.; and Newkirk, Raymond K., 4,978,408, Cl. 156-281.000.
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Peiffer, Dennis G.; Lundberg, Robert D.; Newlove, John C.; and Werlein, Eugen R., 4,978,461, Cl. 252-8.511.
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Wakita, Naomasa; Aoki, Hideharu; and Okuda, Makoto, 4,978,881, Cl. 310-328.000.
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Fowler, Chris W.; Knight, Michael C.; and Nicholas, Anthony J., 4,978,708, Cl. 524-507.000.
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Daly, James C.; Nick, Jeffrey M.; and Rodegeb, Franklin J., 4,979,105, Cl. 364-200.000.
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Nicklas, James R.: *See*—
Nicklas, James R.; Pullen, Antoinette D.; and Nicklas, James R., 4,978,059, Cl. 236-12.170.

Nicoll, Jeff: *See*—
Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., 4,979,100, Cl. 364-200.000.

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Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., 4,979,209, Cl. 379-399.000.

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Kuwahara, Kiyohiro, 4,977,823, Cl. 99-355.000.

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Sawada, Renshi; and Watanabe, Junji, 4,978,379, Cl. 65-18.200.

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Jouin, Patrick; Nisato, Dino; and Castro, Bertrand, 4,978,759, Cl. 548-497.000.

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Mizuno, Toru; Hara, Ryuichi; and Nishi, Hiroji, 4,979,127, Cl. 364-513.000.

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Shimamune, Takayuki; Nishiki, Yoshinori; and Nakamatsu, Shuji, 4,978,438, Cl. 204-265.000.

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Tanikawa, Keizo; Sakoda, Ryozo; Shikada, Ken-ichi; and Tanaka, Sakuya, 4,978,665, Cl. 514-247.000.

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Tawaraya, Makoto, 4,979,079, Cl. 362-135.000.

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Mori, Sanae; and Niwa, Kosaburo, 4,977,664, Cl. 29-563.000.

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Inubushi, Hisao; Yoshihara, Tetsuya; and Sakamoto, Mioshi, 4,978,040, Cl. 222-598.000.

Nobile, Daniel A.: *See*—
Almond, Gary R.; and Nobile, Daniel A., 4,979,169, Cl. 370-99.000.

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Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

Noble, Hazel M.: *See*—
Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

Nobuaki, Kakimori: *See*—
Kishimoto, Shin; Morimoto, Toshihide; Nobuaki, Kakimori; Takahashi, Yuho; and Ohsaki, Morihide, 4,978,224, Cl. 356-394.000.

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Takahashi, Yutaka; Noguchi, Yoshihiro; Yanagida, Takahiro; and Imai, Tomohisa, 4,977,639, Cl. 15-319.000.

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Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, 4,978,648, Cl. 502-127.000.

Norita, Toshio: *See*—
Taniguchi, Nobuyuki; Karasaki, Toshihiko; Ishida, Tokuji; Hamada, Masataka; and Norita, Toshio, 4,979,045, Cl. 358-227.000.

Norris, Donald J.: *See*—
Brownawell, Darrell W.; Norris, Donald J.; and Shaub, Harold, 4,977,871, Cl. 123-196.00A.

Norsolor: *See*—
Yves, Samuel; and Cauvy, Daniel, 4,978,776, Cl. 560-214.000.

North American Container, Inc.: *See*—
Walker, Larry D., 4,978,015, Cl. 215-1.00C.

Northrop Corporation: *See*—
Schmidt, Wayne W.; Benjamin, William P.; and Grimm, Robert A., 4,978,825, Cl. 219-104.300.

Norwood, David A.: *See*—
Manns, William G.; Wood, Anthony B.; and Norwood, David A., 4,979,223, Cl. 382-8.000.

Norwood, Eugene E., to Dairyland Automation, Inc. Rapid exit parlor system. 4,977,856, Cl. 119-14.030.

Nosler, John C. Low-weight, low-aerodynamic-drag disk wheel cover. 4,978,174, Cl. 301-37.00R.

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Venkataswamy, Krishna; Waack, Richard; Novich, Bruce E.; and Halloran, John W., 4,978,643, Cl. 501-94.000.

Nowman, William G. Safe drilling rig. 4,978,257, Cl. 408-111.000.

NTN-Rulon Industries, Co., Ltd.: *See*—
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Nuding, Ursula, legal representative: *See*—
Gillner, Manfred; Wlaschitsch, Josef; and Nuding, Werner, deceased, 4,978,207, Cl. 350-631.000.

Nuding, Werner, deceased: *See*—
Gillner, Manfred; Wlaschitsch, Josef; and Nuding, Werner, deceased, 4,978,207, Cl. 350-631.000.

Numata, Katuyosi: *See*—
Umemoto, Akio; Aoki, Yuji; Numata, Katuyosi; and Suzuki, Hideo, 4,979,200, Cl. 378-185.000.

O.M.G. di Diorgio Pessina e Aldo Perobelli S.n.c.: *See*—
Perobelli, Aldo; and Giorgio, Pessina, 4,977,726, Cl. 53-542.000.

Obana, Yoshinari: *See*—
Hashimoto, Hiroshi; Aruga, Tatsuo; Fujisawa, Eiichi; and Obana, Yoshinari, 4,977,870, Cl. 123-195.00C.
Obata, Masahiko: *See*—
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; Masubuchi, Takamichi; and Sakama, Masao, 4,977,811, Cl. 84-600.000.
Oberdorfer, Hans, to Hansa Metallwerke AG. Pipe Interrupter. 4,977,920, Cl. 137-218.000.
Occidental Chemical Corporation: *See*—
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Stults, Jeffrey S., 4,978,798, Cl. 568-316.000.
Oce-Nederland B.V.: *See*—
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Matsuda, Teruo; Miki, Masayoshi; and Ochi, Hiromu, 4,978,424, Cl. 156-664.000.
Ochiai, Kiyoshi, to Sumitomo Rubber Industries, Ltd. Pneumatic tire having defined lug groove configuration. 4,977,942, Cl. 152-209.00B.
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O'Donnell, Patrick F.: *See*—
Daugherty, Paul R.; McNair, Jerry R.; and O'Donnell, Patrick F., 4,978,485, Cl. 264-40.200.
O'Donnelly, Brian E.: *See*—
Fister, Julius C.; Cherukuri, Satyam C.; Mahulikar, Deepak; and O'Donnelly, Brian E., 4,978,052, Cl. 228-123.000.
Ofstead, Ronald F., to Minnesota Mining and Manufacturing Company. Article having non-crosslinked crystallized polymer coatings. 4,977,901, Cl. 128-772.000.
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Baur, Richard; Birnbach, Stefan; Oftring, Alfred; and Winkler, Ekhard, 4,978,805, Cl. 568-622.000.
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Akimoto, Mitsuru; Jimbo, Takamasa; Umemura, Kiyoshi; Iwase, Haruhiko; and Ogawa, Kenzirou, 4,978,914, Cl. 324-158.00F.
Ogawa, Michio: *See*—
Misaki, Atsushi; Kono, Masao; Ogawa, Michio; and Okamoto, Mitsuhiro, 4,978,609, Cl. 435-7.000.
Ogawa, Minoru; Sakamoto, Koichiro; Tamura, Toshiyuki; and Katsuumi, Kazushige, to Tokyo Electric Company, Ltd. Photoelectric conversion device. 4,979,007, Cl. 357-30.000.
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Knight, Larry F.; Ogilvie, Daniel K.; and Worsham, Ronny W., 4,977,921, Cl. 137-266.000.
Ogino, Akihiko: *See*—
Fukahori, Yoshihide; Kojima, Hiromu; and Ogino, Akihiko, 4,978,581, Cl. 428-492.000.
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Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 4,979,006, Cl. 357-23.700.
Ogushi, Akira; and Uemura, Hisashi, to Kanzaki Paper Mfg. Co., Ltd. Thermal printer. 4,978,973, Cl. 346-76.0PH.
Ohara, Shumpei: *See*—
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.
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Inoue, Toshihiko; Uemura, Kazuki; Oshima, Katsushi; Ohashi, Hajime; and Sano, Yuji, 4,979,121, Cl. 364-474.360.
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Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, 4,978,761, Cl. 549-462.000.
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Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; Ichihara, Yukio; and Sasaki, Toshio, 4,977,842, Cl. 112-199.000.
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Ohmi, Tadahiro; and Umeda, Masaru, 4,977,855, Cl. 118-722.000.
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Sekiguchi, Hiroshi; Sekine, Atsushi; and Ohmiya, Mitsuaki, 4,978,890, Cl. 315-117.000.
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Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.
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Morii, Mitsuyoshi; Ohoka, Masaharu; Suzuki, Toshihiko; Suzuki, Katsuyuki; Kawashima, Nobuhiro; Morii, Noriko; and Mori, Kunizo, 4,978,620, Cl. 435-226.000.
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Tsujiuchi, Junpei; Ikeda, Shigeto; Honda, Toshio; Ohyama, Nagaaki; and Kikuchi, Susumu, 4,979,225, Cl. 382-17.000.
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Agrawal, Govind P.; and Olsson, Nils A., 4,979,234, Cl. 455-608.000.
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Fujiwara, Akinori; Matsuoka, Hiroshi; Onoe, Susumu; and Kusaka, Kenji, 4,978,409, Cl. 156-315.000.
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Matsumoto, Akihiko; Nagasawa, Fumihiro; and Onozuka, Kuniharu, 4,979,057, Cl. 360-71.000.
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Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, 4,978,588, Cl. 204-192.310.
Oota, Yasato: *See—*
Matsumura, Hiroshi; Oota, Yasato; Matsumura, Tadashi; and Abe, Takayuki, 4,977,912, Cl. 134-104.400.
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Fikentscher, Rolf; Greif, Norbert; Oppenlaender, Knut; and Stork, Karl, 4,978,780, Cl. 562-42.000.
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Silva, Robert M., deceased; Orazio, Fred D., Jr.; and Sledge, Robert B., Jr., 4,978,862, Cl. 250-572.000.
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Osipov, Alexei V.: *See—*
Fedorov, Svyatoslav N.; Bagrov, Sergei N.; Trofimov, Vladislav T.; Amstislavskaya, Tatyana S.; and Osipov, Alexei V., 4,978,352, Cl. 606-166.000.
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Erdosi, Gyorgy; Balint, Laszlo ; and Osvath, Peter, 4,977,686, Cl. 34-9.500.
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Oswalt, James A.; and Oswalt, Brenda K., 4,977,630, Cl. 5-81.00R.
Oswalt, James A.; and Oswalt, Brenda K. Patient mover. 4,977,630, Cl. 5-81.00R.
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Goddard, Joan S.; Overby, Wayne A.; and Valent, James A., 4,978,849, Cl. 250-235.000.
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von der Crone, Jost; Overney, Gonzague; and Dario, Peter, 4,978,768, Cl. 558-416.000.
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Ozawa, Kyoichi: *See—*
Shindo, Isao; Tao, Ryuji; and Ozawa, Kyoichi, 4,977,776, Cl. 73-1.00G.
Ozawa, Yoshimichi: *See—*
Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, 4,978,740, Cl. 528-272.000.
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Radke, Daniel D.; Pabodie, Robert M., Jr.; and Ball, Garry L., 4,978,273, Cl. 414-697.000.
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Tillotson, James A., III; and Crowe, Kenneth M., 4,978,442, Cl. 209-215.000.
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Fisher, Charles P.; and Pahud, George M., 4,977,712, Cl. 51-380.000.
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Paper Converting Machine Company: *See—*
Blom, Lawrence E., 4,977,803, Cl. 83-23.000.
Paquette, Edward L.; Riley, William C.; Taparauskas, Paul A.; and Warren, James W., to Refractory Composites, Inc. Printed circuit board with inorganic insulating matrix. 4,979,019, Cl. 357-80.000.
Paquin, Gregory J., to Ricon Corporation. Wayside lift. 4,977,981, Cl. 187-41.000.
Pardo, Jorge, to National Concrete Masonry Association. Roof paver element and system. 4,977,730, Cl. 52-602.000.
Parenti, Robert V.: *See—*
Von Widmann, George; and Parenti, Robert V., 4,977,977, Cl. 181-235.000.

Parker, James F.: *See*—
Kisor, Gregory H.; Parker, James F.; and King, Edward J., 4,979,039, Cl. 358-133.000.

Parti, Sandro: *See*—
Casini, Alessandro; Parti, Sandro; and Bucci, Paolo, 4,978,772, Cl. 560-45.000.

Partin, Dale L.; Heremans, Joseph P.; and Morelli, Donald T., to General Motors Corporation. Magnetoresistor. 4,978,938, Cl. 338-32.00R.

Pascal Company, Inc.: *See*—
Smith, Lawrence C., 4,978,510, Cl. 422-310.000.

Pascal, Le Normand: *See*—
Levrai, Roland; and Pascal, Le Normand, 4,978,820, Cl. 200-82.00D.

Pascuchi, Josep M. V. I., to Rhoderton Corporation N.V. Anti-viral agent. 4,978,687, Cl. 514-708.000.

Pasternak, Ely Shavit: *See*—
Tannenbaum, Joseph, 4,977,895, Cl. 128-421.000.

Pathak, Saroj: *See*—
Hoff, David; and Pathak, Saroj, 4,978,905, Cl. 323-314.000.

Patsiokas, Stelios J.: *See*—
Johnson, Brian K. A.; and Patsiokas, Stelios J., 4,979,231, Cl. 455-58.000.

Patterson, Michael W.: *See*—
Millerick, Michael A.; and Patterson, Michael W., 4,978,830, Cl. 219-121.670.

Paul, Alan: *See*—
Berger, Harvey L.; Paul, Alan; and Broe, William J., 4,978,067, Cl. 239-102.200.

Paul, Francois B.: *See*—
Biton, Jacques; Gellf, Gerard; Michel, Jean-Marc; Paul, Francois B.; and Monsan, Pierre F., 4,978,751, Cl. 536-123.000.

Paul, Kermit D., to Fuller Company. Blender for solid particulate material. 4,978,227, Cl. 366-101.000.

Paulsen, Craig, to International Game Technology. Coin wiper for escalator hopper. 4,978,322, Cl. 453-57.000.

Paurat GmbH: *See*—
Rothkegel, Roland, 4,978,173, Cl. 299-81.000.

Payraudeau, Louis: *See*—
Pierson, Gilles; Payraudeau, Louis; and Bellot, Jean, 4,978,499, Cl. 420-87.000.

Payton, Howard F.: *See*—
Sanderson, John R.; Marquis, Edward T.; and Payton, Howard F., 4,978,799, Cl. 568-385.000.

Peacock, Ronald E.: *See*—
Alston, Howard W.; Peacock, Ronald E.; and Schondell, Douglas G., 4,977,967, Cl. 175-45.000.

Pearmain, Douglas S.: *See*—
LaRoche, Allan R.; Pearmain, Douglas S.; and Kelleher, Denis M., 4,977,719, Cl. 52-396.000.

Pease Industries, Inc.: *See*—
Guetle, Norbert J., Jr., 4,977,705, Cl. 49-478.000.

Peckinpaugh, Roger. Adjustable support. 4,978,098, Cl. 248-523.000.

Peiffer, Dennis G.; Lundberg, Robert D.; Newlove, John C.; and Werlein, Eugen R., to Exxon Research and Engineering Company. Low and high temperature drilling fluids based on sulfonated terpolymer ionomers. 4,978,461, Cl. 252-8.511.

Peine, Klaus-Dieter: *See*—
Wichert, Bernhard; and Peine, Klaus-Dieter, 4,978,090, Cl. 248-74.100.

Pelaez, Jose: *See*—
Periman, Robert D.; and Pelaez, Jose, 4,977,700, Cl. 43-57.200.

Pelz, Herbert; Kluting, Bernd; Wagener, Heinz-Jurgen; and Berghof, Hans-Joachim, to Keiper Recaro GmbH & Kg. Seat with adjustable back and arm rests. 4,978,170, Cl. 297-411.000.

Penick, Joe E.: *See*—
Krambeck, Frederick J.; Penick, Joe E.; and Schipper, Paul H., 4,978,440, Cl. 208-113.000.

Pennington, Willis J.: *See*—
Koster, Robert A.; Brondsema, Philip J.; Pennington, Willis J.; Sumner, William C.; and Vilmer, Susan E., 4,978,811, Cl. 568-734.000.

Perdu, Michel, to Societe Nationale Industrielle et Aerospatiale. Method and system for monitoring the propellant consumption of a space vehicle. 4,979,119, Cl. 364-442.000.

Periman, Robert D.; and Pelaez, Jose. Carrier for fishing leaders. 4,977,700, Cl. 43-57.200.

Permanent Solution Industries, Inc.: *See*—
Ii Yoo, Kim, 4,978,375, Cl. 55-493.000.

Permelec Electrode Ltd : *See*—
Shimamune, Takayuki; Nishiki, Yoshinori; and Nakamatsu, Shuji, 4,978,438, Cl. 204-265.000.

Perobelli, Aldo; and Giorgio, Pessina, to O.M.G. di Diorgio Pessina e Aldo Perobelli S.n.c. Continuous signature stacker machine provided with special device for transversely ejecting the assembled package. 4,977,726, Cl. 53-542.000.

Perrin, Patrice, to Rhone-Poulenc Chimie. Storage-stable organopolysiloxane compositions moisture-curable into elastomeric state. 4,978,704, Cl. 524-404.000.

Perron, Robert: *See*—
Bluthe, Norbert; and Perron, Robert, 4,978,801, Cl. 568-428.000.

Perry, Phillip J.; Meldrum, John A. D.; Metlikovec, Jordon; Bauer, Michael J.; and White, Clive S., to Oliver J. Nilsen (Australia) Limited. Electrical energy analyzer. 4,978,911, Cl. 324-142.000.

Perryman, Michael A. C.; and Cox, Graham C., to Agence Spatiale Europeene. Method and apparatus for sub-pixel centroiding of a photon event. 4,979,221, Cl. 382-1.000.

Perzan, Wayne A.: *See*—
Holtey, Thomas O.; Murray, Thomas L., Jr.; Perzan, Wayne A.; and Smith, Scott W., 4,979,104, Cl. 364-200.000.

Pesce, Sergio, to Minnesota Mining and Manufacturing Company. Combination of photosensitive elements for use in radiography. 4,978,599, Cl. 430-139.000.

Peterman, Steven L.: *See*—
Nanda, Madan M.; Peterman, Steven L.; and Stanasolovich, David, 4,978,419, Cl. 156-643.000.

Petershans, Horst. Process for producing low-alcohol wine. 4,978,547, Cl. 426-387.000.

Petrakos, Stephanie; and Gaewsky, John P., to Polaroid Corporation. Variable color-output strobe. 4,978,892, Cl. 315-358.000.

Petri, Voker: *See*—
Andres, Rudolf; Knoll, Heinz; Pfistner, Harald; and Petri, Voker, 4,978,139, Cl. 280-805.000.

Petro, Timothy L., Sr.: *See*—
Allen, Dennis; Del Fava, Donald; Geesey, Harold D.; Koht, Lowell I.; McClintic, Mark S.; Newton, Dean A.; and Petro, Timothy L., Sr., 4,978,194, Cl. 350-96.230.

Petrolite Corporation: *See*—
Weers, Jerry J., 4,978,366, Cl. 44-334.000.

Pettit, George R.; and Singh, Sheo B., to Arizona Board of Regents. Synthesis of dolastatin 10. 4,978,744, Cl. 530-330.000.

Peurifoy, David L. Fire hose clamp device. 4,978,100, Cl. 251-8.000.

Pezzoli, Luigi, to Vamatex S.p.A. Edge guide for weft gripper belt. 4,977,932, Cl. 139-449.000.

Pfennings, Leonardus C. M. G., to U.S. Philips Corp. Integrated circuit with on-chip voltage converter. 4,978,867, Cl. 307-296.600.

Pfiester, James R.: *See*—
Poon, Stephen S.; Pfiester, James R.; Baker, Frank K.; and Klein, Jeffrey L., 4,978,626, Cl. 437-44.000.

Pfistner, Harald: *See*—
Andres, Rudolf; Knoll, Heinz; Pfistner, Harald; and Petri, Voker, 4,978,139, Cl. 280-805.000.

Pfleiderer GmbH: *See*—
Pontow, Bernd; Wenning, Hans-Peter; Grimminger, Albert; and Strecker, Jurgen, 4,978,369, Cl. 48-197.00R.

Pfohl, Sigberg; Kroener, Michael; Hartmann, Heinrich; and Denzinger, Walter, to BASF Aktiengesellschaft. Water-soluble copolymers containing vinylamine units as wet strength and dry strength agent for paper. 4,978,427, Cl. 162-168.200.

Pharmaconsult, Inc.: *See*—
Dugger, Harry A., 4,978,533, Cl. 424-456.000.

Pharmedic Co.: *See*—
El-Rashidy, Tahany, 4,978,532, Cl. 424-448.000.

Phelps, Craig H.; Sampath, Krishnaswamy; and Shu, Paul, to Mobil Oil Corporation. Sodium hydroxide treatment of field water in a biopolymer complex. 4,977,960, Cl. 166-274.000.

Philibert, Daniel: *See*—
Teutsch, Jean-Georges; Torelli, Vesperto; Deraedt, Roger; Philibert, Daniel; and Costerousse, Germain, 4,978,657, Cl. 514-175.000.

Philipp-Buterowe, Wolfgang; and Kalze, Franz-Josef, to Hella KG Hueck & Co. Bowl-shaped reflector for a vehicle headlight. 4,979,077, Cl. 362-61.000.

Philippe, Eric, to Valeo Vision. Securing device for securing a member to a support plate and having an expandable boss. 4,978,264, Cl. 411-26.000.

Phillips, Charles A.: *See*—
Fullerton, Larry W., 4,979,186, Cl. 375-23.000.

Phillips, Gregory, to Plus Marketing Corp. Harness for moistened-tissue dispenser. 4,978,095, Cl. 248-312.000.

Phillips Petroleum Company: *See*—
Albers, Lloyd R., 4,979,091, Cl. 364-148.000.
Shaw, James E., 4,978,796, Cl. 568-68.000.

Pick, William. Pleated charged media air filter. 4,978,372, Cl. 55-132.000.

Picker International, Inc.: *See*—
Hinks, Richard S., 4,978,919, Cl. 324-313.000.

Pierce, Stanley L., to Ford Motor Company. Automatic transaxle assembly for an automotive vehicle driveline. 4,978,328, Cl. 475-66.000.

Pierson, Gilles; Payraudeau, Louis; and Bellot, Jean, to Unimetal. Soft steel for machine cutting and method of producing it. 4,978,499, Cl. 420-87.000.

Pigneul, Raymond; Ruppel, Remy; and Laurent, Pierre, to Beghin-Say SA. Absorbent laminated sheet and manufacturing process for such a sheet. 4,978,565, Cl. 428-156.000.

Pinkahsov, Eduard, to Vapor Technologies Inc. Electrode for vapor deposition and vapor-deposition method using same. 4,978,556, Cl. 427-37.000.

Pioneer Electronic Corporation: *See*—
Araki, Yoshitugu, 4,979,160, Cl. 369-75.200.
Murata, Yasushi, 4,979,030, Cl. 358-56.000.
Shimada, Naoki; Ishii, Hidehiro; Sato, Masuhiro; and Shinohara, Masayori, 4,979,048, Cl. 358-342.000.
Ujihara, Takashi, 4,978,844, Cl. 250-216.000.

Piretti, Giancarlo. Chair having retractable ganging apparatus and cooperating stacking pad. 4,978,168, Cl. 297-248.000.

Pitman, William B.: *See*—
Cope, Johanthan C.; Davis, Alan E.; Pitman, William B.; and Row, Kathy M., 4,978,548, Cl. 426-439.000.

Pitney Bowes Inc.: *See*—
Chen, Robert K. T.; Jackson, Winslow E.; and Kim, Paul H. K., 4,978,839, Cl. 235-375.000.
Holbrook, Russell W., 4,978,114, Cl. 271-35.000.

Plambeck, Kenneth E.: *See*—
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

Plaxin, Georgy V.: *See*—
Surovikin, Vitaly F.; Plaxin, Georgy V.; Semikolenov, Vladimir A.; Likholobov, Vladimir A.; and Tiunova, Ilona J., 4,978,649, Cl. 502-416.000.

Plus Marketing Corp.: *See*—
Phillips, Gregory, 4,978,095, Cl. 248-312.000.

Plys, Albert G.: *See*—
Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., 4,977,839, Cl. 110-346.000.

Pocrass, Alan. Connector with visual indicator. 4,978,317, Cl. 439-490.000.

Poillon, Dominique: *See*—
Cutayar, Jacques-Marcel; Poillon, Dominique; and Cutayar, Sylvie, 4,978,545, Cl. 426-312.000.

Polaroid Corporation: *See*—
Etzel, Mark R., 4,978,974, Cl. 346-107.00R.
Farrington, David L., 4,978,991, Cl. 354-436.000.
McAuley, Kenneth A.; and Silveira, Frank S., 4,978,113, Cl. 271-10.000.
Petrakos, Stephanie; and Gaewsky, John P., 4,978,892, Cl. 315-358.000.

Polistock N.V.: *See*—
Ardissone, Alberto, 4,978,407, Cl. 156-216.000.

Pollock, Thomas J.: *See*—
Walfield, Alan M.; and Pollock, Thomas J., 4,978,623, Cl. 435-320.000.

Poloni, Alfredo, to Danieli & C. Officine Meccaniche SpA. Plant to crop head and tail and to take samples. 4,977,806, Cl. 83-105.000.

Pomeroy, Dan M.: *See*—
Sears, Stephan B.; Pomeroy, Dan M.; and Rhodes, Richard O., 4,978,429, Cl. 202-172.000.

Pomponi, Massimo: *See*—
Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., 4,978,673, Cl. 514-411.000.

Pong, William: *See*—
Weiman, Carl F. R.; and Pong, William, 4,979,136, Cl. 364-572.000.

Pontow, Bernd; Wenning, Hans-Peter; Grimminger, Albert; and Strecker, Jurgen, to Veba OEL Entwicklungs-Gesellschaft mbH; and Pfleiderer GmbH. Process for feeding carbonaceous material into reaction spaces. 4,978,369, Cl. 48-197.00R.

Poon, Stephen S.; Pfiester, James R.; Baker, Frank K.; and Klein, Jeffrey L., to Motorola, Inc. LDD transistor process having doping sensitive endpoint etching. 4,978,626, Cl. 437-44.000.

Pope, John: *See*—
King, James L., Sr.; King, James L., Jr.; and Pope, John, 4,977,979, Cl. 184-15.100.

Poplawski, John R.: *See*—
Schmidt, Eric; and Poplawski, John R., 4,978,144, Cl. 283-70.000.

Popovic, Radivoje; Solt, Katalin; and Lienhard, Heinz, to LGZ Landis & Gyr Zug AG. Non-volatile memory device including a micro-mechanical storage element. 4,979,149, Cl. 365-244.000.

Portage Electric Products, Inc.: *See*—
Givler, Omar R., 4,978,937, Cl. 337-372.000.

Porter, Jeffrey A., to Motorola, Inc. State metric memory arrangement for a viterbi decoder. 4,979,175, Cl. 371-43.000.

Porter, Neil: *See*—
Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

Possum Controls Limited: *See*—
Gemmell, David; and Irvine, Duncan A., 4,979,094, Cl. 364-188.000.

Postma, Robert C., to Hach Associates, Inc. Flexible writing surface. 4,978,568, Cl. 428-192.000.

Potier, Michel; and Briet, Gilles, to Valeo Thermique Moteur; and Hutchinson. Rapid action coupling system for a heat exchanger fluid tank. 4,977,954, Cl. 165-76.000.

Potter, Robert W.: *See*—
Humitz, John N.; Potter, Robert W.; and Kostrzewa, Kenneth J., 4,978,014, Cl. 211-195.000.

Potter, Terry; Breno, Philip J.; and Bright, Lyn E., to B & H Manufacturing Company, Inc. Stack fed labeling machine. 4,978,416, Cl. 156-571.000.

Poulin, Mark R.: *See*—
Kotzin, Michael D.; van den Heuvel, Anthony P.; Crisler, Kenneth J.; Hiben, Bradley M.; Mohl, Lawrence M.; and Poulin, Mark R., 4,979,188, Cl. 375-34.000.

PPG Industries, Inc.: *See*—
Kuhn, John J., 4,978,866, Cl. 307-228.000.

Pratt, Hugh M. O., to Barnes, Thomas J. Load monitor. 4,977,783, Cl. 73-862.390.

Prentice, John S., to Harris Corporation. SCR structure for fast turn-on switching. 4,979,011, Cl. 357-38.000.

Prestige Collection, Inc.: *See*—
Mesica, Zuri; and Golan, Igal, 4,977,757, Cl. 63-15.000.

Prevorsek, Dusan C.: *See*—
Das, Sajal; and Prevorsek, Dusan C., 4,978,727, Cl. 525-504.000.

Price, Jeffrey E.: *See*—
Donnelly, Donald E.; Zikes, Bradley C.; Moore, Dwain F.; Price, Jeffrey E.; and Toth, Bartholomew L., 4,978,292, Cl. 431-75.000.

Price, Stanley J., Jr. Method and apparatus for harvesting fruit crops from bushes or the like. 4,977,736, Cl. 56-330.000.

Priest, Richard J.; and Priest, Richard J., Jr., to Jimelco, Inc. Transformer dismantling salvage system. 4,977,665, Cl. 29-564.300.

Priest, Richard J., Jr.: *See*—
Priest, Richard J.; and Priest, Richard J., Jr., 4,977,665, Cl. 29-564.300.

Prignitz, Herbert. Thermal insulation material as insulating and sealing layer for roof areas. 4,977,711, Cl. 52-309.800.

Princeton X-Ray Laser: *See*—
Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., 4,979,203, Cl. 378-206.000.

Pringle, Ronald E., to Camco International Inc. Subsurface well safety valve with light weight components. 4,977,957, Cl. 166-321.000.

Printing Research, Inc.: *See*—
Douglas, David D., 4,977,828, Cl. 101-142.000.

Pro Patch Systems, Inc.: *See*—
Hoffman, Dennis, Sr., 4,977,718, Cl. 52-288.000.

Procter & Gamble Company, The: *See*—
Barbera, Melvin A.; Agricola, Francis O.; Faller, Robert V.; and Bowman, Worth D., 4,978,522, Cl. 424-52.000.
Halas, Linda A., 4,978,475, Cl. 252-549.000.
Kock, Ronald W.; Gosselin, Peter G.; and Reiboldt, H. Norman, 4,977,826, Cl. 99-516.000.

Proizvodstvennoe Obiedinenie Atomnogo Turbostroenia "Kharkov Sky Turbinny Zavod" Imeni S.M. Kirova: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Prosl, Frank R.: *See*—
Melsky, Gerald S.; and Prosl, Frank R., 4,978,338, Cl. 604-93.000.

Pruden, Benny J.; Wisnik, Howard; and Hudis, Scott, to Mars Incorporated. Method and apparatus for electronic payphone open switch interval management. 4,979,208, Cl. 379-145.000.

Prunbauer, Kurt, to Evva-Werk Spezialerzeugung Von Zylinder- und Sicherheitsschlossern Gesellschaft m.b.H. & Co. Kommanditgesellschaft. High-security flat key and lock therefor. 4,977,767, Cl. 70-406.000.

Prusoff, William H.: *See*—
Lin, Tai-Shun; and Prusoff, William H., 4,978,655, Cl. 514-50.000.

Prysock, Arnold. Fish skinning device, and methods of constructing and utilizing same. 4,977,643, Cl. 452-187.000.

Przywarty, Francis L.: *See*—
Drake, Curtis L.; Przywarty, Francis L.; and Ammon, Robert L., 4,978,557, Cl. 427-37.000.

Pullen, Antoinette D.: *See*—
Nicklas, James R.; Pullen, Antoinette D.; and Nicklas, James R., 4,978,059, Cl. 236-12.170.

Pum, Hannes, to Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft. Apparatus for needling a web supported by a grate of blades transverse to needing direction. 4,977,653, Cl. 28-115.000.

Purcell, Ricky W., to Scovill Fasteners Inc. Fastener setting machine having double-acting drive means. 4,978,048, Cl. 227-149.000.

Purdue Research Foundation: *See*—
Babbs, Charles F.; and Badylak, Stephen F., 4,978,668, Cl. 514-258.000.

Puri, Amitabh: *See*—
Barrett, William A.; and Puri, Amitabh, 4,978,841, Cl. 250-548.000.

Purohit, Parul V.; Kirsch, Jeffery L.; and MacDonald, James C., to CVD Incorporated. Method for preparing laminates of ZnSe and ZnS. 4,978,577, Cl. 428-409.000.

Pusey, Donald K.: *See*—
Falcoff, Allan F.; Fountain, Frank S.; and Pusey, Donald K., 4,977,853, Cl. 118-665.000.

Puydak, Robert C.: *See*—
Hazelton, Donald R.; and Puydak, Robert C., 4,978,717, Cl. 525-195.000.

PWH Anlagen & Systeme GmbH: *See*—
Mohr, Helmut, 4,978,000, Cl. 198-641.000.

Pyne, Clive R.: *See*—
Drew, Walter; and Pyne, Clive R., 4,978,222, Cl. 356-374.000.

Quaker Chemical Corporation: *See*—
Dillon, Edward T., 4,978,512, Cl. 423-226.000.

Quaker Oats Company, The: *See*—
Brown, Robert L.; Shilen, Robert D.; and Rosnak, Robert F., 4,978,124, Cl. 273-129.00S.
Finnerty, Suja P.; and Lenz, Marvin K., 4,978,543, Cl. 426-243.000.

Qualcomm, Inc.: *See*—
Gilhousen, Klein S.; Jacobs, Irwin M.; and Weaver, Lindsay A., Jr., 4,979,170, Cl. 370-104.100.

Quambusch, Heinz: *See*—
Roche, Edouard; Himmelmann, Wolfgang; Buschmann, Hans-Theo; and Quambusch, Heinz, 4,978,607, Cl. 430-642.000.

Quarles, Ronald A.: *See*—
Roos, Charles E.; and Quarles, Ronald A., 4,977,837, Cl. 110-165.00A.

Quenzi, Philip J.; and Somero, David W. Apparatus and method for controlling laser guided machines. 4,978,246, Cl. 404-84.000.

Questra Chemicals Corp.: *See—*
Eckler, Paul E., 4,978,741, Cl. 528-279.000.

Quignon, Thierry: *See—*
Fontanes, Sylvain; Birot, Patrice; Marguinaud, Andre ; Quignon, Thierry; and Romann, Brigitte, 4,979,215, Cl. 381-49.000.

Quirijnen, A. J., to Emerson Electric Co. Mounting device for brushes in a reversible commutator motor. 4,978,877, Cl. 310-239.000.

Quirk, Jennifer M.; Harsy, Stephen G.; and Hakansson, Christer L., to *W. R. Grace & Co.-Conn. Novel process for the preparation of* serinol. 4,978,793, Cl. 564-487.000.

R. de Groot Holding Laag-Zuthem B.V.: See—
de Groot, Rob, 4,978,274, Cl. 414-744.300.

Ractliff, Perry A. Method for cleaning contact lenses. 4,978,535, Cl. 424-661.000.

Radke, Daniel D.; Pabodie, Robert M., Jr.; and Ball, Garry L., to Ford New Holland, Inc. Loader bucket control. 4,978,273, Cl. 414-697.000.

Radogna, Thomas V.: *See—*
Gelinas, Robert G.; and Radogna, Thomas V., 4,979,141, Cl. 364-787.000.

Radvan, Bronislaw; Willis, Anthony J.; and Wallace, Peter L., to Wiggins Teape Group Limited, The. Process for the manufacture of *a permeable sheet-like fibrous structure.* 4,978,489, Cl. 264-118.000.

Rajaonarivello, Claude: *See—*
Frejaville, Serge; Mittelman, Philippe; Rajaonarivello, Claude; and *Naud, Jean-Michel,* 4,977,747, Cl. 62-50.100.

Rambold, Adolf, to Teepack Spezialmaschinen GmbH & Co. KG. Machine for making tea-filled double-chamber bags. 4,977,728, Cl. 53-567.000.

Ramos, Josiane: *See—*
Brehm, Claude; Ramos, Josiane; and Dupont, Philippe, 4,978,377, Cl. 65-3.110.

Ramsay, Michael V. J.: See—
Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

Ramsey, Thomas: *See—*
Stierman, Roger J.; Heinen, K. Gail; Ramsey, Thomas; and Haefling, James F., 4,979,015, Cl. 357-69.000.

Ransheim, Anders, to Gedevelop Electronics AB. Method and arrangement for determining the size and/or the shape of a freely falling object. 4,978,859, Cl. 250-560.000.

Rasmussen GmbH: See—
Sauer, Heinz, 4,978,149, Cl. 285-256.000.

Rattle, Simon J.: *See—*
Forrest, Gordon C.; Rattle, Simon J.; Robinson, Grenville A.; and Hill, Hugh A. O., 4,978,610, Cl. 435-7.000.

Ray, Eric T.; and Vigg, Peter A., to GBE International PLC. Tobacco block slicing machine. 4,977,907, Cl. 131-290.000.

Raychem Corporation: *See—*
Tomita, Akira, 4,978,193, Cl. 350-96.210.

Raynet Corporation: See—
Allen, Dennis; Del Fava, Donald; Geesey, Harold D.; Koht, Lowell I.; McClintic, Mark S.; Newton, Dean A.; and Petro, Timothy L., Sr., 4,978,194, Cl. 350-96.230.

RCA Licensing Corporation: See—
Wine, Charles M., 4,979,047, Cl. 358-335.000.

Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., to *Upjohn Company,* The. Anthelmintic quaternaryalkyl acylhydrazones, method of use and compositions. 4,978,670, Cl. 514-345.000.

Redcliffe Electronics Limited: *See—*
Allen, John W., 4,978,824, Cl. 200-447.000.

Redding, Bruce K., Jr. Apparatus and method for making microcapsules. 4,978,483, Cl. 264-4.320.

Redicon Corporation: *See—*
Bulso, Joseph D., Jr.; and McClung, James A., 4,977,772, Cl. 72-336.000.

Reese, Robert T.: *See—*
Ardeshir, Feroza; Flint, Janette E.; and Reese, Robert T., 4,978,621, Cl. 435-243.000.

Refractory Composites, Inc.: *See—*
Paquette, Edward L.; Riley, William C.; Taparauskas, Paul A.; and Warren, James W., 4,979,019, Cl. 357-80.000.

Regimand, Ali: *See—*
Troxler, William F., Sr.; and Regimand, Ali, 4,979,197, Cl. 378-90.000.

Rehrig, James B.: *See—*
Apps, William P.; Rehrig, James B.; and Hagan, John A., 4,978,002, Cl. 206-201.000.

Rehrig-Pacific Company, Inc.: *See—*
Apps, William P.; Rehrig, James B.; and Hagan, John A., 4,978,002, Cl. 206-201.000.

Reiboldt, H. Norman: *See—*
Kock, Ronald W.; Gosselin, Peter G.; and Reiboldt, H. Norman, 4,977,826, Cl. 99-516.000.

Reid, Laurie M.; and Hunt, Gary D., to Simplimatic Engineering Company. Computer controlled article handling device. 4,978,275, Cl. 414-789.500.

Reier, Gerald J.: *See—*
Andrews, Robert S. L.; and Reier, Gerald J., 4,978,076, Cl. 241-5.000.

Reim, Wolfgang; and Weller, Dieter, to Siemens Aktiengesellschaft. Magneto-optical storage medium. 4,978,584, Cl. 428-611.000.

Reimer, Ernest M., to Canpolar East Inc. Detection of anomalies in translucent material by candling. 4,978,225, Cl. 356-432.000.

Reimer, William A.: *See—*
Vonder, David L.; and Reimer, William A., 4,978,912, Cl. 324-158.00P.

Reinhart, Gale M.: *See—*
Gesslein, Bruce W.; Guth, Jacob J.; Mintz, Gilbert R.; Reinhart, *Gale M.; and Smith, Laurence R.,* 4,978,526, Cl. 424-70.000.

Reiskin, Edward: *See—*
Bialy, Louis; Cooney, Anthony; Sheridan, William; and Reiskin, Edward, 4,977,982, Cl. 187-89.000.

Rekers, John W.: *See—*
Kluger, Edward W.; and Rekers, John W., 4,978,362, Cl. 18-506.000.

Relyea, Herbert C.: See—
Frankel, Neil A.; Lindblad, Nero R.; Relyea, Herbert C.; and Meyer, Robert J., 4,978,999, Cl. 355-299.000.

Rembrandt Photo Services: See—
Miller, William R., 4,978,055, Cl. 229-72.000.

Remington, Scott; and Martino, William L., Jr., to Motorola, Inc. *Structure and method for improving high speed data rate in a* DRAM. 4,979,145, Cl. 364-900.000.

Renaux, Charley: *See—*
Lemercier, Guy; and Renaux, Charley, 4,978,497, Cl. 376-290.000.

Renco Systems, Inc.: *See—*
Kaufman, Arnold S., 4,977,884, Cl. 126-299.00R.

Repla Limited: *See—*
Taylor, Donald M., 4,977,722, Cl. 52-731.000.

Reske, Eckart; and Wolters, Ernst, to Hoechst Aktiengesellschaft. Toughened polyoxymethylene and shaped articles produced there*from. 4,978,725, Cl. 525-399.000.*

Resource Enterprises, Inc.: *See—*
Schwoebel, Jeffrey J.; and Logan, Terry L., 4,978,172, Cl. 299-12.000.

Reul, Kurt: *See—*
Dieudonne, Walter; Mittelstadt, Norbert; and Reul, Kurt, 4,978,836, Cl. 219-388.000.

Reus, Jurgen: *See—*
Hartmann, Ralf; and Reus, Jurgen, 4,978,865, Cl. 307-140.000.

Revlon, Inc.: *See—*
Kamen, Melvin E.; Bernstein, Philip; and Defazio, Augustine, 4,978,524, Cl. 424-64.000.

Rhoads, Jack L. Self-adjusting variable duration hydraulic lifter. 4,977,867, Cl. 123-90.490.

Rhoderton Corporation N.V.: *See—*
Pascuchi, Josep M. V. I., 4,978,687, Cl. 514-708.000.

Rhodes, David: *See—*
Newman, Alec T.; and Rhodes, David, 4,978,032, Cl. 221-119.000.

Rhodes, Richard O.: *See—*
Sears, Stephan B.; Pomeroy, Dan M.; and Rhodes, Richard O., 4,978,429, Cl. 202-172.000.

Rhone-Poulenc Chimie: *See—*
Bluthe, Norbert; and Perron, Robert, 4,978,801, Cl. 568-428.000.
Chizat, Francois, 4,978,701, Cl. 524-265.000.
Perrin, Patrice, 4,978,704, Cl. 524-404.000.

Rialan, Joseph; and Thierry, Gerard, to Institut Francais du Petrole. Device for transmiting signals by radio and cable between a central control and recording system and data acquisition devices. 4,979,152, Cl. 367-77.000.

Rib Loc Australia Pty. Ltd.: *See—*
Menzel, Stanley W. O., 4,977,931, Cl. 138-154.000.

Ribbon Technology Corporation: *See—*
Hackman, Lloyd E., 4,977,951, Cl. 164-453.000.

Ricciardi, Fiore J.: See—
Nelson, Mark L.; Doukas, Peter H.; Salganicoff, Leon; and Ricciardi, Fiore J., 4,978,662, Cl. 514-235.800.

Richard, Hans-Gunter, to Krupp koppers GmbH. Device for cooling hot product gas exiting from a gasification reactor. 4,978,368, Cl. 48-87.000.

Richard, J. Robert, to Richard, J. Robert. General utility hand-grip assist pad. 4,977,621, Cl. 2-20.000.

Richards, William A.: *See—*
Ellsworth, Roger D.; Richards, William A.; Samuels, James T.; and *Bober, James K., 4,978,858, Cl. 250-560.000.*

Richardson, Edmund S.: *See—*
Upton, Ronald D.; Branz, Michael A.; and Richardson, Edmund S., 4,977,754, Cl. 62-248.000.

Richter, Bill. Tennis ball receptacle and dispenser. 4,978,041, Cl. 222-608.000.

Ricoh Company: See—
Okubo, Hiromi; Itoh, Takanori; and Murai, Kazuo, 4,979,129, Cl. 364-518.000.

Ricoh Company, Ltd.: See—
Aizawa, Hideo, 4,978,998, Cl. 355-273.000.
Akamatsu, Hiroyuki, 4,978,996, Cl. 355-231.000.
Furuya, Hiromi; and Hayakawa, Kunio, 4,978,651, Cl. 503-216.000.
Sato, Gen, 4,979,226, Cl. 382-21.000.
Takahashi, Harumi, 4,978,995, Cl. 355-206.000.
Taniguchi, Keishi; and Yamaguchi, Junko, 4,978,709, Cl. 524-606.000.

Ricon Corporation: *See—*
Paquin, Gregory J., 4,977,981, Cl. 187-41.000.

Rietter, Josef; Tyukodi, Istvan; and Schindler, Reinhard, to Siemens Aktiengesellschaft. Liquid circulation system for an apparatus for disintegrating calculi in the body of a life form and method of operation. 4,977,888, Cl. 128-24.00A.

Riley, Christopher J.: *See*—
Gregoli, Armand A.; Hamshar, John A.; Olah, Andrew M.; Riley, Christopher J.; and Rimmer, Daniel P., 4,978,365, Cl. 44-301.000.

Riley, William C.: *See*—
Paquette, Edward L.; Riley, William C.; Taparauskas, Paul A.; and Warren, James W., 4,979,019, Cl. 357-80.000.

Rimmer, Daniel P.: *See*—
Gregoli, Armand A.; Hamshar, John A.; Olah, Andrew M.; Riley, Christopher J.; and Rimmer, Daniel P., 4,978,365, Cl. 44-301.000.

Rinker, Eric D., to Westinghouse Electric Corp. Hydraulic lock for displacer rod drive mechanism (DRDM) and method of operation. 4,978,494, Cl. 376-235.000.

Rio Grande-Albuquerque, Inc.: *See*—
Wellington, Robert; and Bell, Louis, 4,978,256, Cl. 408-72.00R.

Ristow, Daniel B.: *See*—
Ristow, Delano H.; and Ristow, Daniel B., 4,977,659, Cl. 29-235.000.

Ristow, Delano H.; and Ristow, Daniel B. Tool for seating tubing in a concealed roofing base rail. 4,977,659, Cl. 29-235.000.

Ritter, Ann M.; Siemers, Paul A.; and Spriggs, Donald R., to General Electric Company. Silicon carbide fiber-reinforced titanium base composites of improved tensile properties. 4,978,585, Cl. 428-614.000.

Roadmaster Corporation: *See*—
Metcalf, Jeffrey D., 4,977,794, Cl. 74-572.000.

Robb, John R. Snap-apart universal jointed electrical connection. 4,978,306, Cl. 439-8.000.

Robbins, Max L.: *See*—
Bock, Jan; Canevari, Gerard P.; and Robbins, Max L., 4,978,459, Cl. 210-749.000.

Roberson, Glenn A., Jr.; and Eglinton, Robert B., to Semifab Incorporated. Vapor device and method for drying articles such as semiconductor wafers with substances such as isopropyl alcohol. 4,977,688, Cl. 34-92.000.

Robert Krups Stiftung & Co. KG.: *See*—
Lorenz, Horst, 4,977,819, Cl. 99-279.000.

Robert S. Scheurer: *See*—
Scheurer, Robert S.; and Heavers, Robert G., 4,978,566, Cl. 428-157.000.

Roberts, Malcolm T.; Robins, Michael P.; and Sharrott, Ian E., to General Electric Company, plc, The. Automated vehicle control. 4,979,113, Cl. 364-424.020.

Robertson, Gordon I.: *See*—
Abramovich, Abe; and Robertson, Gordon I., 4,978,220, Cl. 356-394.000.

Robins, Michael P.: *See*—
Roberts, Malcolm T.; Robins, Michael P.; and Sharrott, Ian E., 4,979,113, Cl. 364-424.020.

Robinson, Alan S.: *See*—
Fuller, Mark W.; and Robinson, Alan S., 4,978,066, Cl. 239-12.000.

Robinson, Grenville A.: *See*—
Forrest, Gordon C.; Rattle, Simon J.; Robinson, Grenville A.; and Hill, Hugh A. O., 4,978,610, Cl. 435-7.000.

Robinson, Stephen E.; and Black, William C., Jr., to Biomagnetic Technologies, Inc. Analysis of biological signals using data from arrays of sensors. 4,977,896, Cl. 128-653.00R.

Roche, Edouard; Himmelmann, Wolfgang; Buschmann, Hans-Theo; and Quambusch, Heinz, to AGFA-Gevaert Aktiengesellschaft. Photographic recording material. 4,978,607, Cl. 430-642.000.

Rochte, Jerry E.: *See*—
Laine, Donald D.; Rochte, Jerry E.; and Wolcott, Frederick C., 4,979,093, Cl. 364-167.010.

Rockefeller University, The: *See*—
Cerami, Anthony; and Yamin, Michael A., 4,978,684, Cl. 514-632.000.

Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, to Salutar, Inc. Novel manganese(II) DTPA chelate. 4,978,763, Cl. 556-50.000.

Rockwell International Corporation: *See*—
Ashley, James P., 4,979,171, Cl. 370-110.200.
Fadner, Thomas A., 4,977,830, Cl. 101-350.000.
Vick, Gerald L., 4,978,183, Cl. 350-3.670.

Rodegeb, Franklin J.: *See*—
Daly, James C.; Nick, Jeffrey M.; and Rodegeb, Franklin J., 4,979,105, Cl. 364-200.000.

Roden, Dennis J.: *See*—
Carpenter, Robert S.; Rodriguez, Ernesto M.; and Roden, Dennis J., 4,978,218, Cl. 353-119.000.

Roden, Walter C. Mailbox signal. 4,978,057, Cl. 232-35.000.

Rodgers, Colin, to Sundstrand Corporation. Simplified inlet guide vane construction for a rotary compressor. 4,978,279, Cl. 415-151.000.

Rodriguez, Ernesto M.: *See*—
Carpenter, Robert S.; Rodriguez, Ernesto M.; and Roden, Dennis J., 4,978,218, Cl. 353-119.000.

Rolland, Jean-Luc: *See*—
Mage, Jean-Claude; Rolland, Jean-Luc; and Castera, Jean-Paul, 4,979,064, Cl. 360-125.000.

Rolls-Royce plc: *See*—
Tubbs, Henry, 4,978,280, Cl. 415-159.000.

Romann, Brigitte: *See*—
Fontanes, Sylvain; Birot, Patrice; Marguinaud, Andre ; Quignon, Thierry; and Romann, Brigitte, 4,979,215, Cl. 381-49.000.

Rommel, Joseph L. Water purifier for aquariums. 4,978,444, Cl. 210-169.000.

Roos, Charles E.; and Quarles, Ronald A., to National Recovery Technologies, Inc. Process and apparatus for reducing heavy metal toxicity in fly ash from solid waste incineration. 4,977,837, Cl. 110-165.00A.

Roper, John A., III: *See*—
Lyons, John W.; Roper, John A., III; and Aldrich, Peter D., 4,978,863, Cl. 250-574.000.

Roschenbleck, Benno: *See*—
Schmeling, Edith L.; Roschenbleck, Benno; and Weidemann, Michael H., 4,978,432, Cl. 204-58.400.

Rosenbaum, Larry A., to Baxter International Inc. Multi-layer film structures for providing two webs of film. 4,978,579, Cl. 428-483.000.

Rosenthal, Bruce D., to Teledyne Industries, Inc. Drail-well/extension high voltage MOS transistor structure and method of fabrication. 4,978,628, Cl. 437-44.000.

Rosnak, Robert F.: *See*—
Brown, Robert L.; Shilen, Robert D.; and Rosnak, Robert F., 4,978,124, Cl. 273-129.00S.

Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, to Didier-Werke AG. Gas washing sink without integral closure member. 4,978,108, Cl. 266-220.000.

Rothkegel, Roiand, to Paurat GmbH. Holder for cutter in mining machine. 4,978,173, Cl. 299-81.000.

Rothlin, Peter, to Sulzer Brothers Limited. Key for a circuit board. 4,978,818, Cl. 200-406.000.

Rotta Research Laboratorium S.p.A.: *See*—
Rovati, Angelo L.; Rovati, Claudio L.; and Makovec, Francesco, 4,978,683, Cl. 514-617.000.

Roullet, Alain: *See*—
Dubrulle, Gerard; and Roullet, Alain, 4,977,723, Cl. 53-110.000.

Roussel Uclaf: *See*—
Teutsch, Jean-Georges; Torelli, Vesperto; Deraedt, Roger; Philibert, Daniel; and Costerousse, Germain, 4,978,657, Cl. 514-175.000.

Roussel-Ulcaf: *See*—
Biton, Jacques; Gelif, Gerard; Michel, Jean-Marc; Paul, Francois B.; and Monsan, Pierre F., 4,978,751, Cl. 536-123.000.

Rovati, Angelo L.; Rovati, Claudio L.; and Makovec, Francesco, to Rotta Research Laboratorium S.p.A. Proglumide and pharmaceutical compositions containing it for use in the treatment of neoplastic affections. 4,978,683, Cl. 514-617.000.

Rovati, Claudio L.: *See*—
Rovati, Angelo L.; Rovati, Claudio L.; and Makovec, Francesco, 4,978,683, Cl. 514-617.000.

Rovenszky, Franz: *See*—
Binder, Dieter; Rovenszky, Franz; and Ferber, Hubert P., 4,978,671, Cl. 514-366.000.

Row, Kathy M.: *See*—
Cope, Johanthan C.; Davis, Alan E.; Pitman, William B.; and Row, Kathy M., 4,978,548, Cl. 426-439.000.

Rowan, Timothy M.: *See*—
Merrison, John C.; DeLange, Robert J.; and Rowan, Timothy M., 4,978,897, Cl. 318-268.000.

Rowe, Carroll G.; and Little, John D. Foldable hay rake. 4,977,734, Cl. 56-15.900.

Royce Medical Company: See—
Grim, Tracy E., 4,977,891, Cl. 128-80.00H.

Rozas, Fernando C. Guiding instrument to pierce the bone cortical, auxiliary in the location of the holes for intra-marrow pins. 4,978,351, Cl. 606-98.000.

Rubin, Julius. Pressurization of liquid carbon dioxide cylinder. 4,978,832, Cl. 392-400.000.

RUD-Kettenfabrik Rieger & Dietz GmbH u. Co.: See—
Smetz, Reinhard G. E., 4,977,649, Cl. 24-573.100.

Rugarli, Pier L.: *See*—
Meroni, Carlo; Maiorana, Stefano; Brufani, Mario; Pomponi, Massimo; Bernardi, Riccardo; Rugarli, Pier L.; and Pagella, Pier G., 4,978,673, Cl. 514-411.000.

Ruhnke, Jeffrey P.: *See*—
Lulloff, Ricky H.; Ruhnke, Jeffrey P.; and Lloyd, Robert C., 4,977,741, Cl. 60-310.000.

Rumbaugh, Scott H.; Jones, Michael D.; and Bos, Philip J., to Tektronix, Inc. Polarization controller for use in optical fiber communication system. 4,979,235, Cl. 455-616.000.

Rumpf, Horst H.: *See*—
Klos-Hein, Karl; and Rumpf, Horst H., 4,977,787, Cl. 74-54.000.

Rundquist, Carl E., to Rundquist, F. William; and Rundquist, Robert A. Boat propulsion and handling system. 4,977,845, Cl. 114-289.000.

Rundquist, F. William: *See*—
Rundquist, Carl E., 4,977,845, Cl. 114-289.000.

Rundquist, Robert A.: *See*—
Rundquist, Carl E., 4,977,845, Cl. 114-289.000.

Runnalls, Larry G. Lock box. 4,977,764, Cl. 70-63.000.

Runstadler, Peter W., Jr.: *See*—
Dean, Robert C., Jr.; Grela, Peter V.; Karkare, Subhash B.; and Runstadler, Peter W., Jr., 4,978,616, Cl. 435-70.300.

Rupe, Robert E. Automatic drop hammer system. 4,977,965, Cl. 173-81.000.

Ruppel, Remy: *See*—
Pigneul, Raymond; Ruppel, Remy; and Laurent, Pierre, 4,978,565, Cl. 428-156.000.

Rupprecht, Kathleen M.; and Boger, Joshua S., to Merck & Co., Inc. 6- and/or 7-substituted-1,2,3,4,4A,9B-hexahydro-8-hydroxydibenzofuran-3-ols as inhibitors of leukotriene biosynthesis. 4,978,679, Cl. 514-468.000.

Rusch, Friedrich-Wilheim: *See—*
Gorlitz, Frank-Otto; and Rusch, Friedrich-Wilheim, 4,978,011, Cl. 209-694.000.

Rust, Ralph J.: *See—*
Grimshaw, Michael N.; Albers, Stephen J.; and Rust, Ralph J., 4,978,417, Cl. 156-574.000.

Ruth Silver and Company: *See—*
Silver, Albert L., 4,978,044, Cl. 224-202.000.

RWO (Marine Equipment) Limited: *See—*
McVey, Carl, 4,977,795, Cl. 74-575.000.

Rxtec, Incoporated: *See—*
Jewett, Bryce D., Sr., deceased, 4,977,675, Cl. 33-028.000.

Ryken, John M.: *See—*
Chaplin, John B.; Moore, Robert G.; and Ryken, John M., 4,978,320, Cl. 440-052.000.

Ryno, Robert W., to A. O. Smith Corporation. Nozzle mix, open power burner. 4,978,293, Cl. 431-258.000.

Rzeszewski, Theodore S., to AT&T Bell Laboratories. Video signal enhancement by adaptive digital signal processing. 4,979,228, Cl. 382-54.000.

S & G Tool Aid Corp.: *See—*
Fodali, Adolph, 4,978,312, Cl. 439-219.000.

Saad, Saad M., to Andrew Corportion. Semi-flexible double-ridge waveguide. 4,978,934, Cl. 333-241.000.

Sabater, Jacques; Kerneis, Jean C.; and Bauduin, Serge, to Centre Technique de l'Industrie des Papiers, Cartons et Celluloses. Device for the continuous determination of a surface state index for a moving creped sheet. 4,978,861, Cl. 250-571.000.

Sachdev, Harbans S.: *See—*
Bruce, James A.; Kerbaugh, Michael L.; Kwong, Ranee W.; Lee, Tanya N.; Linde, Harold G.; and Sachdev, Harbans S., 4,978,594, Cl. 430-14.000.

Sachse, Wolfgang H.; and Grabec, D. Igor, to Cornell Research Foundation. Adaptive, neural-based signal processor. 4,979,124, Cl. 364-507.000.

Sadai, Masanao: *See—*
Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, 4,978,681, Cl. 514-557.000.

Safford, Carl A. Tie knot. 4,977,624, Cl. 2-152.00R.

Sagara, Hisao: *See—*
Kosugi, Seiji; Ando, Norio; and Sagara, Hisao, 4,978,148, Cl. 285-133.100.

Sagawa, Eiichi: *See—*
Ibi, Akira; Kitagawa, Masanori; Sagawa, Eiichi; Takeuchi, Koichi; and Ohkawado, Etsuo, 4,978,754, Cl. 544-176.000.

Sager, David J.; Hesch, Leon D.; Ingraham, Andrew D.; and Samaras, William A., to Digital Equipment Corporation. Method and apparatus for stabilized data transmission. 4,979,190, Cl. 375-106.000.

Saito, Hiroshi, to Canon Kabushiki Kaisha. Laser scanning apparatus with deflector and receiver in an optically conjugate relationship. 4,978,975, Cl. 346-108.000.

Saito, Katsuyuki: *See—*
Uehara, Masao; Sasagawa, Katsuyoshi; Yamashita, Shinji; Sasaki, Masahiko; Saito, Katsuyuki; Kanoo, Masahide; Uchikubo, Akinobu; Nakagawa, Takehiro; and Hasegawa, Jun, 4,979,035, Cl. 358-98.000.

Saito, Syozo: *See—*
Takizawa, Akio; Furuta, Fumio; and Saito, Syozo, 4,978,966, Cl. 343-788.000.

Saito, Takahiro; and Ito, Junichi, to Japan Aviation Electronics Industry Limited. Azimuth signal generator. 4,977,679, Cl. 33-316.000.

Saitoh, Kazuo. Gabexate mesylate ointment. 4,978,534, Cl. 424-484.000.

Saitou, Norikazu: *See—*
Tsuruoka, Yoshiaki; and Saitou, Norikazu, 4,979,159, Cl. 369-58.000.

Sajiki, Hironao: *See—*
Tomiyama, Tsuyoshi; Tomiyama, Akira; Wakabayshi, Shuichi; Sajiki, Hironao; and Sekiguchi, Junko, 4,978,674, Cl. 514-445.000.

Sakai, Masanori, to Canon Kabushiki Kaisha. Image reading apparatus having amplification factors vary in response to a spatial frequency of an input image signal. 4,979,027, Cl. 358-75.000.

Sakai, Mitsugu: *See—*
Karaki, Koichi; Sakai, Mitsugu; and Sasaki, Yasuo, 4,977,779, Cl. 73-606.000.

Sakai, Yozo, to Mitsubishi Denki Kabushiki Kaisha. Machining tank with decomposed gas removal. 4,978,827, Cl. 219-69.110.

Sakama, Masao: *See—*
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; Masubuchi, Takamichi; and Sakama, Masao, 4,977,811, Cl. 84-600.000.

Sakama, Mitsunori: *See—*
Yamazaki, Shunpei; Inujima, Takashi; Hamatani, Toshiji; Konuma, Toshimitsu; Sakama, Mitsunori; Kobayashi, Ippei; and Yamaguchi, Toshiharu, 4,978,203, Cl. 350-339.00R.

Sakamoto, Hidenobu, to Mitsubishi Denki Kabushiki Kaisha. Magnetic resonance imaging method. 4,978,918, Cl. 324-309.000.

Sakamoto, Hiroshi: *See—*
Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, 4,978,749, Cl. 536-27.000.

Sakamoto, Koichiro: *See—*
Ogawa, Minoru; Sakamoto, Koichiro; Tamura, Toshiyuki; and Katsuumi, Kazushige, 4,979,007, Cl. 357-30.000.

Sakamoto, Masaaki: *See—*
Mori, Sanae; Sakamoto, Masaaki; Wada, Motomu; and Ishikawa, Hideo, 4,978,587, Cl. 428-645.000.

Sakamoto, Masanori: *See—*
Abe, Kunihiro; and Sakamoto, Masanori, 4,977,881, Cl. 123-489.000.

Sakamoto, Mioshi: *See—*
Inubushi, Hisao; Yoshihara, Tetsuya; and Sakamoto, Mioshi, 4,978,040, Cl. 222-598.000.

Sakamoto, Yoshito, to Sumitomo Electric Industries, Ltd. Polyphenylene oxide moldings radiation crosslinked with (meth)acrylated phosphoric acid or admixtures. 4,978,693, Cl. 522-137.000.

Sakata, Yuji: *See—*
Tabata, Fumio; Sekiguchi, Hidenori; Kamada, Toru; and Sakata, Yuji, 4,979,195, Cl. 378-34.000.

Sakoda, Ryozo: *See—*
Tanikawa, Keizo; Sakoda, Ryozo; Shikada, Ken-ichi; and Tanaka, Sakuya, 4,978,665, Cl. 514-247.000.

Salce, Arthur J.: *See—*
Metcalfe, Richard T.; and Salce, Arthur J., 4,977,627, Cl. 2-437.000.

Salganicoff, Leon: *See—*
Nelson, Mark L.; Doukas, Peter H.; Salganicoff, Leon; and Ricciardi, Fiore J., 4,978,662, Cl. 514-235.800.

Salutar, Inc.: *See—*
Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, 4,978,763, Cl. 556-50.000.

Salzmann, Thomas N.: *See—*
DiNinno, Frank P.; Muthard, David A.; and Salzmann, Thomas N., 4,978,659, Cl. 514-210.000.

Samaras, William A.: *See—*
Sager, David J.; Hesch, Leon D.; Ingraham, Andrew D.; and Samaras, William A., 4,979,190, Cl. 375-106.000.

Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, to Kubota, Ltd. Four wheel steering tractor having a mid-mount mower. 4,977,733, Cl. 56-14.700.

Samen, Lynda S. Combined earthquake sensor and night light. 4,978,948, Cl. 340-690.000.

Sammet, Roy J. Disc container assembly. 4,978,005, Cl. 206-312.000.

Sampath, Krishnaswamy: *See—*
Phelps, Craig H.; Sampath, Krishnaswamy; and Shu, Paul, 4,977,960, Cl. 166-274.000.

Samsung Electronics Co., Ltd.: *See—*
Hong, Sung-Pyo, 4,979,044, Cl. 358-168.000.
Seo, Soon K.; and Cho, Hae S., 4,977,822, Cl. 99-348.000.
Shon, Jin-Ki, 4,978,821, Cl. 200-83.00W.

Samsung Semiconductor & Telecommunication Co., Ltd.: *See—*
Kim, Myung S., 4,978,630, Cl. 437-32.000.

Samuels, James T.: *See—*
Ellsworth, Roger D.; Richards, William A.; Samuels, James T.; and Bober, James K., 4,978,858, Cl. 250-560.000.

Sandels, Claes M. C. Self repairing elastic bodies. 4,978,563, Cl. 428-63.000.

Sanden Corporation: *See—*
Aoki, Hisao; and Yamaguchi, Toru, 4,977,956, Cl. 165-176.000.

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Sanderson, John R.; Marquis, Edward T.; and Payton, Howard F., to Texaco Chemical Company. Production of detergent range alcohols and ketones using porphyrin catalysts. 4,978,799, Cl. 568-385.000.

Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., to Texaco Chemical Company. Production of detergent range alcohols and ketones using acetylacetonate catalysts. 4,978,800, Cl. 568-385.000.

Sandvik AB: *See—*
Tjernstrom, Eric, 4,978,262, Cl. 409-233.000.

Sanjuan, Antonio B. Device for electronic control of the supply of a heating resistance. 4,978,838, Cl. 219-497.000.

Sano, Eiichi: *See—*
Anno, Masahiro; Machida, Junji; Ohtani, Junji; Sano, Eiichi; and Masuda, Fumio, 4,978,595, Cl. 430-106.600.

Sano, Hisanori: *See—*
Matsuura, Atsushi; Honda, Kazuo; Inukai, Shinji; and Sano, Hisanori, 4,978,887, Cl. 313-635.000.

Sano, Yuji: *See—*
Inoue, Toshihiko; Uemura, Kazuki; Oshima, Katsushi; Ohashi, Hajime; and Sano, Yuji, 4,979,121, Cl. 364-474.360.

Sano, Yukio: *See—*
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Sanofi, S.A. and Institut National de la Sante et de la Recherche Medicale: *See—*
Jouin, Patrick; Nisato, Dino; and Castro, Bertrand, 4,978,759, Cl. 548-497.000.

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Ohyama, Yasuaki, 4,978,525, Cl. 424-70.000.

Sanwa Kagaku Kenkyusho Co., Ltd.: *See—*
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

Sanyo Electric Co., Ltd.: *See*—
Masumoto, Takahiko, 4,979,040, Cl. 358-138.000.
Mizutani, Yosuke; Asano, Takehiko; Yanase, Syuji; Kitagawa, Shinichiro; and Yamashita, Akihiko, 4,979,037, Cl. 358-133.000.

Saperstein, Richard; Tolman, Richard L.; and Slater, Eve E., to Merck & Co., Inc. Substituted 6H-7,8-dihydrothiapyrano(3,2-d)-pyrimidines as hypoglycemic agents. 4,978,667, Cl. 514-258.000.

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Sasaki, Kenichi: *See*—
Kanno, Tatsuya; Takahashi, Ikuo; Sasaki, Kenichi; Iguichi, Yoshihiro; and Fukuda, Yutaka, 4,978,578, Cl. 428-412.000.

Sasaki, Masahiko: *See*—
Uehara, Masao; Sasagawa, Katsuyoshi; Yamashita, Shinji; Sasaki, Masahiko; Saito, Katsuyuki; Kanoo, Masahide; Uchikubo, Akinobu; Nakagawa, Takehiro; and Hasegawa, Jun, 4,979,035, Cl. 358-98.000.

Sasaki, Toshio: *See*—
Fukao, Hiroaki; Ohkita, Teruhiko; Nagasaka, Nobusuke; Ichihara, Yukio; and Sasaki, Toshio, 4,977,842, Cl. 112-199.000.

Sasaki, Yasuo: *See*—
Karaki, Koichi; Sakai, Mitsugu; and Sasaki, Yasuo, 4,977,779, Cl. 73-606.000.

Sasaki, Yoshinori: *See*—
Takashige, Masao; Iwai, Teruyuki; Takeichi, Hidenobu; Takai, Yasuo; Sasaki, Yoshinori; Masuoka, Masato; and Ohki, Yuichi, 4,978,484, Cl. 264-40.100.

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Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Sathre, Robert: *See*—
Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., 4,979,203, Cl. 378-206.000.

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Shimada, Naoki; Ishii, Hidehiro; Sato, Masuhiro; and Shinohara, Masayori, 4,979,048, Cl. 358-342.000.

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Haga, Toru; Nagano, Eiki; Sato, Ryo; and Morita, Kouichi, 4,978,787, Cl. 564-218.000.

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Sato, Tsuyoshi: *See*—
Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.

Sato, Yoshio: *See*—
Minemura, Hiroyuki; Sato, Yoshio; Tsuboi, Nobuyoshi; Koyanagi, Hiroaki; and Ohyama, Shinji, 4,978,187, Cl. 350-96.110.

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Ohmi, Tadahiro; Mihara, Hiroshi; and Satoh, Kiyoshi, 4,977,916, Cl. 137-8.000.

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Ohtsuka, Masuhiro; Satoh, Yuji; and Kono, Hiromi, 4,977,992, Cl. 192-0.073.

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Lampbell, Al, 4,978,303, Cl. 434-258.000.

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Misawa, Takeshi; and Sawachi, Youichi, 4,979,024, Cl. 358-37.000.

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Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

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Inagaki, Jitsuo; and Sawata, Hisako, 4,978,458, Cl. 210-748.000.

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Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

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Courtois, Pierre-Jacques F.; Scheys, Guy F. J.; and Semal, Pierre-Nicholaas W., 4,979,168, Cl. 370-95.100.

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Grafe, Ingomar; Schickaneder, Helmut; and Ahrens, Kurt H., 4,978,773, Cl. 560-47.000.

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Lioy, Daniel C.; Hurtubis, Edward F.; and Schickler, Edward R., 4,977,656, Cl. 29-121.800.

Schiffers, Theo, to H. Krantz GmbH & Co. Covering device for a fabric inlet and outlet slot of tenter housing. 4,977,651, Cl. 26-106.000.

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Rietter, Josef; Tyukodi, Istvan; and Schindler, Reinhard, 4,977,888, Cl. 128-24.00A.

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Krambeck, Frederick J.; Penick, Joe E.; and Schipper, Paul H., 4,978,440, Cl. 208-113.000.

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Mittelbach, Helmut; Mueller, Xaver; and Schlegel, Peter, 4,979,227, Cl. 382-40.000.

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Stansfield, Orlin M.; and Schleicher, Robert W., Jr., 4,978,480, Cl. 264-0.500.

Schlein, Barry C.: *See*—
Madden, Thomas J.; Schlein, Barry C.; and Wagner, W. Barry, 4,977,740, Cl. 60-39.463.

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Janssen, Sylvain; and Fournier, Jacques, 4,978,374, Cl. 55-165.000.

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Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

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Wilhelm, Klaus; Bauer, Johann; Schmitt, Werner; Herold, Wolf-Dietrich; Koran, Peter; Wanek, Erich; and Gasser, Oswald, 4,978,359, Cl. 623-23.000.

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Niederhauser, Werner, 4,978,341, Cl. 604-167.000.

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Stotzel, Gilbert; Fuhrmann, Jorg; and Schneider, Joachim, 4,978,233, Cl. 384-12.000.

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Collins, Thomas J.; Schneider, Pina; Nieves, Anthony L.; and Graham, Thomas G., 4,979,209, Cl. 379-399.000.

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Buchanan, John S.; and Schoennagel, Hans J., 4,978,441, Cl. 208-113.000.

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Silverstein, Steven; and Scholz, Christopher, 4,978,004, Cl. 206-224.000.

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Alston, Howard W.; Peacock, Ronald E.; and Schondell, Douglas G., 4,977,967, Cl. 175-45.000.

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Wehrmann, Rolf; Schopper, Heinrich-Christian; and Nerger, Dittmar K., 4,978,732, Cl. 528-71.000.

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Hirsch, Christian; Schroder, Dieter; Kopowski, Eckart; and Kocher, Helmut, 4,978,153, Cl. 292-201.000.

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Anderson, Franklin R.; and Schroer, John M., 4,978,091, Cl. 248-74.300.

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Haines, Bernard M., 4,977,903, Cl. 128-842.000.

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Mader, Gerald E., 4,977,990, Cl. 192-58.00B.

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Sclafani, Louis D.: *See*—
Cremins, John F.; Kim, Young R.; Malin, Michael J.; and Sclafani, Louis D., 4,978,624, Cl. 436-17.000.

Scordamaglia, Raimondo: *See*—
Barbe, Pier C.; Noristi, Luciano; Scordamaglia, Raimondo; Barino, Luisa; Albizzati, Enrico; Giannini, Umberto; and Morini, Giampiero, 4,978,648, Cl. 502-127.000.

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Jones, James E.; and Scott, Clifford Y., 4,978,434, Cl. 204-153.100.

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Seagate Technology, Inc.: *See*—
Ghose, Sanjoy; Battu, Ramgopal; and Jabbari, Iraj, 4,979,063, Cl. 360-106.000.

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Anderson, Carl R.; and Seaman, Gary G., 4,977,934, Cl. 140-147.000.

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Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., 4,978,077, Cl. 241-30.000.

Sechi, Giovanni: *See*—
Messina, Giuseppe; Sechi, Giovanni; Lorenzoni, Loreno; and Bruzzi, Vittorio, 4,978,786, Cl. 564-160.000.

Secretary of State for Defence, The: *See*—
Drew, Walter; and Pyne, Clive R., 4,978,222, Cl. 356-374.000.

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Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, 4,978,108, Cl. 266-220.000.

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Hiraoka, Tetsuo; Ohtsuka, Takenori; Hokazono, Kazuaki; Seike, Shinji; and Sunada, Tomohiro, 4,977,865, Cl. 123-52.0MB.

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Yamada, Yasumasa, 4,978,978, Cl. 346-110.00R.

Seikosha Co., Ltd.: *See*—
Sato, Hiroshi; and Miyauchi, Yoshiaki, 4,978,238, Cl. 400-124.000.
Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 4,979,006, Cl. 357-23.700.

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Tabata, Fumio; Sekiguchi, Hidenori; Kamada, Toru; and Sakata, Yuji, 4,979,195, Cl. 378-34.000.

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Tomiyama, Tsuyoshi; Tomiyama, Akira; Wakabayshi, Shuichi; Sajiki, Hironao; and Sekiguchi, Junko, 4,978,674, Cl. 514-445.000.

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Sekiguchi, Hiroshi; Sekine, Atsushi; and Ohmiya, Mitsuaki, 4,978,890, Cl. 315-117.000.

Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara, Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, to Olympus Optical Co., Ltd. Supersonic hyperthermia treating method. 4,977,902, Cl. 128-804.000.

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Courtois, Pierre-Jacques F.; Scheys, Guy F. J.; and Semal, Pierre-Nicholaas W., 4,979,168, Cl. 370-95.100.

Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei; Inujima, Takashi; Hamatani, Toshiji; Konuma, Toshimitsu; Sakama, Mitsunori; Kobayashi, Ippei; and Yamaguchi, Toshiharu, 4,978,203, Cl. 350-339.00R.

Semifab Incorporated: *See*—
Roberson, Glenn A., Jr.; and Eglinton, Robert B., 4,977,688, Cl. 34-92.000.

Semikolenov, Vladimir A.: *See*—
Surovikin, Vitaly F.; Plaxin, Georgy V.; Semikolenov, Vladimir A.; Likholobov, Vladimir A.; and Tiunova, Ilona J., 4,978,649, Cl. 502-416.000.

Semlitsch, Manfred: *See*—
Frey, Otto; Semlitsch, Manfred; and Weber, Heinz, 4,978,355, Cl. 623-16.000.

Semon, Howard: *See*—
Juneau, Paul W., Jr.; and Semon, Howard, 4,978,400, Cl. 149-21.000.

Senetinger, Bertold: *See*—
Liebl, Helmut; and Senetinger, Bertold, 4,978,855, Cl. 250-310.000.

Sengoku, Masaharu, to Misubishi Denki Kabushiki Kaisha. System for storing data in a separate memory when the number of positioning errors of a magnetic disc exceeds a threshold. 4,979,059, Cl. 360-78.090.

Senoo, Takanori: *See*—
Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, 4,979,210, Cl. 380-3.000.

Seo, Soon K.; and Cho, Hae S., to Samsung Electronics Co., Ltd. Kneading means of a home automatic bread baking device. 4,977,822, Cl. 99-348.000.

Separation Dynamics, Inc.: *See*—
Taylor, John A., 4,978,451, Cl. 210-500.270.

Sepp, Gunther, to Messerschmitt-Boelkow-Blohm GmbH. Laser distance and altitude measuring apparatus. 4,978,221, Cl. 356-4.000.

Sercel, Jeffrey P. Apparatus and method for purification of gases used in exciplex (excimer) lasers. 4,977,749, Cl. 62-51.100.

Serco Corporation: *See*—
Alexander, James C., 4,977,635, Cl. 14-71.300.

Serezhkina, Lidia P.: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Sevilleja, Jose: *See*—
Garrido, Alfonso; Sevilleja, Jose; and Cabanas, Julian, 4,977,983, Cl. 187-95.000.
Sewell, Hestel D. Padlock protector. 4,977,763, Cl. 70-54.000.
Sexton, James E., to Mallinckrodt, Inc. Flour-based foodstuffs with improved texture. 4,978,544, Cl. 426-243.000.
SGS-Thomson Microelectronics, Inc.: *See*—
Liou, Fu-Tai; Lin, Yih-Shung; and Chen, Fusen E., 4,978,637, Cl. 437-193.000.
SGS-Thomson Microelectronics S.r.l.: *See*—
Siligoni, Marco; and Villa, Flavio, 4,979,008, Cl. 357-34.000.
Shacklock, Frank W.: *See*—
Duncan, Gerald; Shacklock, Frank W.; and Greenman, Murray, 4,978,058, Cl. 236-12.120.
Shah, Dinesh: *See*—
Clayton, Donald L.; and Shah, Dinesh, 4,978,813, Cl. 174-117.00F.
Shah, Rajendra K., to General Electric Company. Method and apparatus for controlling a blower motor in an air handling system. 4,978,896, Cl. 318-254.000.
Shahlapour, Farrokh. Planar thickness gauge. 4,977,685, Cl. 33-783.000.
Shankland, Ian R.; and Lund, Earl A. E., to Allied-Signal Inc. Azeotrope-like compositions of pentafluoroethane and difluoromethane. 4,978,467, Cl. 252-69.000.
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Goldenfield, Mark P.; Lambert, David V.; and Shannon, Robert E., 4,978,917, Cl. 324-226.000.
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Devine, Frank M.; and Shapiro, Rod D., 4,978,449, Cl. 210-264.000.
Sharp Kabushiki Kaisha: *See*—
Kishimoto, Shin; Morimoto, Toshihide; Nobuaki, Kakimori; Takahashi, Yuho; and Ohsaki, Morihide, 4,978,224, Cl. 356-394.000.
Komeda, Kenichiro; and Inui, Kenichi, 4,978,129, Cl. 273-237.000.
Suzuki, Tomonari; Wada, Hiroshi; Yoshimoto, Yoshikazu; Yoshida, Masaru; and Nakajima, Shigeo, 4,978,600, Cl. 429-218.000.
Sharrott, Ian E.: *See*—
Roberts, Malcolm T.; Robins, Michael P.; and Sharrott, Ian E., 4,979,113, Cl. 364-424.020.
Shaub, Harold: *See*—
Brownawell, Darrell W.; Norris, Donald J.; and Shaub, Harold, 4,977,871, Cl. 123-196.00A.
Shaw, James E., to Phillips Petroleum Company. N-alkylpyrrolidone solvents for preparation of aromatic thiols. 4,978,796, Cl. 568-68.000.
Shaw, Joel R.: *See*—
Harris, Clark E.; and Shaw, Joel R., 4,978,084, Cl. 242-74.000.
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., to Arco Chemical Technology, Inc. Preparation of methylene diphenylene diisocyanates and polymethylene polyphenylene poly (isocyanates) using an organic sulfonic acid promoter. 4,978,779, Cl. 560-344.000.
Sheh, Leung, to National Science Council. 2,6-dimethoxyhydroquinone-3-mercaptopropionic acid, 2,6-dimethoxyhydroquinone-3-mercaptoacetic acid, and antitumor use thereof. 4,978,783, Cl. 562-431.000.
Shell Oil Company: *See*—
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Wong, Pui-Kwan, 4,978,721, Cl. 525-289.000.
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Sheppard, Julie H., to Dow Corning Limited. Compositions and process for the treatment of textiles comprising a resinous branched polyorganosiloxane and a polydiorganosiloxane in an aqueous dispersion. 4,978,462, Cl. 252-8.600.
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Davies, Gerald G., 4,977,894, Cl. 128-207.150.
Sheridan, William: *See*—
Bialy, Louis; Cooney, Anthony; Sheridan, William; and Reiskin, Edward, 4,977,982, Cl. 187-89.000.
Sherman, Daniel A. Tamper resistant flying insect control device. 4,977,701, Cl. 43-122.000.
Shiba, Haruo: *See*—
Ikebe, Masaru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, 4,979,065, Cl. 360-133.000.
Shibata, Mineharu: *See*—
Edahiro, Takeshi; Kumada, Hiroyoshi; Morita, Toshiki; Takehara, Shin; and Shibata, Mineharu, 4,978,135, Cl. 280-707.000.
Shibuya, Kiyoshi; Sato, Toru; Morito, Nobuyuki; Nara, Seiko; and Hiramatsu, Teruo, to Kawasaki Steel Corporation. Apparatus for transferring rapidly quenched metallic tapes. 4,977,949, Cl. 164-417.000.
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Shikada, Ken-ichi: *See*—
Tanikawa, Keizo; Sakoda, Ryozo; Shikada, Ken-ichi; and Tanaka, Sakuya, 4,978,665, Cl. 514-247.000.
Shikawajima-Harima Jukogyo Kabushi Kaisha: *See*—
Miyahara, Shuji; Kimuro, Harumi; and Yamashita, Saburo, 4,977,910, Cl. 134-7.000.
Shilen, Robert D.: *See*—
Brown, Robert L.; Shilen, Robert D.; and Rosnak, Robert F., 4,978,124, Cl. 273-129.00S.
Shimada, Kazuhiko: *See*—
Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, 4,977,989, Cl. 192-56.00R.
Shimada, Naoki; Ishii, Hidehiro; Sato, Masuhiro; and Shinohara, Masayori, to Pioneer Electronic Corporation. Apparatus for and method of stop control for a spindle motor in a disk player. 4,979,048, Cl. 358-342.000.
Shimamune, Takayuki; Nishiki, Yoshinori; and Nakamatsu, Shuji, to Permelec Electrode Ltd. Electrolytic cell. 4,978,438, Cl. 204-265.000.
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Samejima, Kazuo; Hayashi, Tetsuaki; Bando, Niro; Matsuda, Kenji; Sato, Tsuyoshi; Shimamura, Teruo; Hamada, Toshihiko; Tsuchihashi, Hironori; Togoshi, Yoshikazu; and Fukuda, Masatami, 4,977,733, Cl. 56-14.700.
Shimano Industrial Co., Ltd.: *See*—
Nagano, Masashi, 4,977,792, Cl. 74-502.200.
Shimizu, Chiharu: *See*—
Aihara, Yasuyuki; Baba, Shigeki; Shimizu, Chiharu; and Akiyama, Eitetsu, 4,977,743, Cl. 60-605.300.
Shimizu, Kenichi. Exposure system for image forming apparatus. 4,978,994, Cl. 355-70.000.
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Shimizu, Toru: *See*—
Shiozawa, Shoji; and Shimizu, Toru, 4,978,589, Cl. 429-26.000.
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Hotta, Masao; Shimizu, Toshihiko; and Nejime, Yoshito, 4,978,957, Cl. 341-156.000.
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Aoyama, Norihito; Miike, Akira; Shimizu, Yoshiaki; and Tatano, Toshio, 4,978,615, Cl. 435-25.000.
Shimizume, Kazutoshi; and Kuroda, Hirokazu, to Sony Corporation. Circuit for detecting a synchronizing signal. 4,979,192, Cl. 375-111.000.
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Matsuta, Toyohiko; Shimotashiro, Masafumi; and Kobayashi, Masaaki, 4,979,052, Cl. 360-32.000.
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Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.
Shimura, Masatoshi: *See*—
Yamagishi, Katsuaki; Kashima, Koji; Mitani, Akio; and Shimura, Masatoshi, 4,977,953, Cl. 165-10.000.
Shindo, Isao; Tao, Ryuji; and Ozawa, Kyoichi, to Hitachi, Ltd. Gas mixing device and gas analyzer making use of the same. 4,977,776, Cl. 73-1.00G.
Shingu, Tadashi: *See*—
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.
Shinler, LeRoy J. Roll-up campfire cooking grill assembly. 4,977,824, Cl. 99-449.000.
Shinohara, Kozo: *See*—
Yamada, Osamu; and Shinohara, Kozo, 4,978,516, Cl. 423-331.000.
Shinohara, Masayori: *See*—
Shimada, Naoki; Ishii, Hidehiro; Sato, Masuhiro; and Shinohara, Masayori, 4,979,048, Cl. 358-342.000.
Shinohara, Tooru: *See*—
Hatagami, Toshifumi; Iwatsubo, Masahito; and Shinohara, Tooru, 4,978,902, Cl. 318-608.000.
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Sato, Hiroyuki; and Shinoyama, Yujiro, 4,978,823, Cl. 200-437.000.
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Takano, Tsunesuke; and Shinzawa, Kouichi, 4,979,083, Cl. 362-394.000.
Shionogi & Co., Ltd.: *See*—
Misaki, Atsushi; Kono, Masao; Ogawa, Michio; and Okamoto, Mitsuhiro, 4,978,609, Cl. 435-7.000.
Shiota, Hiroshi: *See*—
Mito, Yoshiki; Sueda, Minoru; Shiota, Hiroshi; and Tashiro, Shozo, 4,977,773, Cl. 72-353.600.
Shiozawa, Shoji; and Shimizu, Toru, to Ishikawajima-Harima Heavy Industries Co., Ltd. Fuel cell. 4,978,589, Cl. 429-26.000.
Shipley, Robert T. Programmed audio controller. 4,979,217, Cl. 381-81.000.
Shirai, Katsuo: *See*—
Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 4,979,006, Cl. 357-23.700.
Shirai, Katsuyuki: *See*—
Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, 4,978,886, Cl. 313-414.000.

Shirai, Kiyoshi: *See—*
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.

Shlepov, Igor A.: *See—*
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Shnarch, Benjamin: *See—*
Neuman, Benzion; and Shnarch, Benjamin, 4,978,206, Cl. 350-543.000.

Shoemaker, Patrick A., to United States of America, Navy. CMOS analog four-quadrant multiplier. 4,978,873, Cl. 307-498.000.

Shoketsu Kinzoku Kogyo Kabushiki Kaisha: *See—*
Kosugi, Seiji; Ando, Norio; and Sagara, Hisao, 4,978,148, Cl. 285-133.100.

Shon, Jin-Ki, to Samsung Electronics Co. Ltd. Reverse flow prevention device for combustion apparatus. 4,978,821, Cl. 200-83.00W.

Showa Denko Kabushiki Kaisha: *See—*
Furuya, Tsutomu, 4,978,617, Cl. 435-125.000.
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Showa Products Company: *See—*
Nakano, Hiroyuki, 4,978,406, Cl. 156-190.000.

Shrinkle, Louis J.: *See—*
Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., 4,979,055, Cl. 360-69.000.
Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., 4,979,056, Cl. 360-69.000.

Shu, Paul: *See—*
Phelps, Craig H.; Sampath, Krishnaswamy; and Shu, Paul, 4,977,960, Cl. 166-274.000.

Shunan Denko Kabushiki Kaisha: *See—*
Uemura, Tadashi; and Hayashi, Shirou, 4,978,294, Cl. 432-103.000.

Shutske, Gregory M., to Hoechst-Roussel Pharmaceuticals Inc. 12-halogenated forskolin derivatives. 4,978,678, Cl. 514-455.000.

Siczek, Aldona A.; and Siczek, Bernard W. Support structure for X-ray imaging apparatus. 4,979,202, Cl. 378-198.000.

Siczek, Bernard W.: *See—*
Siczek, Aldona A.; and Siczek, Bernard W., 4,979,202, Cl. 378-198.000.

Siden, Jan, to Inovac AB. Abrasive wheel. 4,977,709, Cl. 51-206.00R.

Siegemund, Gunter: *See—*
Lau, Jurgen; and Siegemund, Gunter, 4,978,790, Cl. 564-315.000.

Siemens Aktiengesellschaft: *See—*
Finzel, Lothar, 4,978,192, Cl. 350-96.210.
Reim, Wolfgang; and Weller, Dieter, 4,978,584, Cl. 428-611.000.
Rietter, Josef; Tyukodi, Istvan; and Schindler, Reinhard, 4,977,888, Cl. 128-24.00A.

Siemens Telecommunicazioni S.p.A.: *See—*
Marconi, Franco, 4,978,933, Cl. 333-117.000.

Siemers, Paul A.: *See—*
Ritter, Ann M.; Siemers, Paul A.; and Spriggs, Donald R., 4,978,585, Cl. 428-614.000.

Sigrist, Hugo: *See—*
Engel, Walter; Moser, Franz; and Sigrist, Hugo, 4,977,657, Cl. 29-1.210.

Silbermann, Joseph; and Burchill, Michael T., to M&T Chemicals, Inc. Surface modified, U.V. stabilized, polyvinyl chloride article. 4,978,576, Cl. 428-409.000.

Siliconix Incorporated: *See—*
Blanchard, Richard A., 4,978,631, Cl. 437-24.000.

Siligoni, Marco; and Villa, Flavio, to SGS-Thomson Microelectronics S.r.l. Vertical isolated-collector transistor of the pnp type incorporating a device for suppressing the effects of parasitic junction components. 4,979,008, Cl. 357-34.000.

Silva, Robert M., deceased (by Silva, Ruby M., executrix); Orazio, Fred D., Jr.; and Sledge, Robert B., Jr., to VTI, Inc. Method and apparatus for nondestructively measuring micro defects in materials. 4,978,862, Cl. 250-572.000.

Silva, Ruby M., executrix: *See—*
Silva, Robert M., deceased; Orazio, Fred D., Jr.; and Sledge, Robert B., Jr., 4,978,862, Cl. 250-572.000.

Silveira, Frank S.: *See—*
McAuley, Kenneth A.; and Silveira, Frank S., 4,978,113, Cl. 271-10.000.

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Simon, David E.: *See—*
Himes, Ronald E.; and Simon, David E., 4,977,962, Cl. 166-305.100.

Simons, John R., to Star Sprinkler Corporation. Partially concealed fast response sprinkler head. 4,977,963, Cl. 169-37.000.

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Simplimatic Engineering Company: *See—*
Reid, Laurie M.; and Hunt, Gary D., 4,978,275, Cl. 414-789.500.

Simpson, Clarence D.: *See—*
Morris, Arleen; and Simpson, Clarence D., 4,978,030, Cl. 221-3.000.

Simpson, Elmer, to Elmer Simpson & Edgar Powell. Motor fault detector with optical isolation. 4,979,069, Cl. 361-31.000.

Sinclair, Peter J.: *See—*
Blizzard, Timothy A.; Mrozik, Helmut; Marino, Gaye; and Sinclair, Peter J., 4,978,656, Cl. 514-63.000.

Sindo Ricoh Co., Ltd.: *See—*
Kim, Geun; and Kang, Seung-Il, 4,978,993, Cl. 355-58.000.

Singh, Sheo B.: *See—*
Pettit, George R.; and Singh, Sheo B., 4,978,744, Cl. 530-330.000.

Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., to Proizvodstvennoe Obiedinenie Atomnogo Turbostroenia "Kharkov Sky Turbinny Zavod" Imeni S.M. Kirova. Non-combustible lubricating fluid. 4,978,466, Cl. 252-49.300.

Skawinski, Louis. DC sine cosine servo system. 4,978,900, Cl. 318-560.000.

SKC Limited: *See—*
Kim, Jae Hwan, 4,978,083, Cl. 242-56.900.

SKF Mekanprodukter AB: *See—*
Ostling, Sture, 4,978,236, Cl. 384-480.000.

Skinner, Charles H.: *See—*
Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., 4,979,203, Cl. 378-206.000.

Slater, Eve E.: *See—*
Saperstein, Richard; Tolman, Richard L.; and Slater, Eve E., 4,978,667, Cl. 514-258.000.

Slawinski, Nora. Pet carrier bag. 4,977,857, Cl. 119-19.000.

Sledge, Robert B., Jr.: *See—*
Silva, Robert M., deceased; Orazio, Fred D., Jr.; and Sledge, Robert B., Jr., 4,978,862, Cl. 250-572.000.

Smart, David C.; Cloutier, Robert P.; Pagano, Daniel M.; and Kirk, Duane B., to Eastman Kodak Company. Film cassette having film-exposure status indicator. 4,978,985, Cl. 354-275.000.

Smerker, Charles W. Slip resistent apparatus for canes, crutches and walkers. 4,977,914, Cl. 135-81.000.

Smetz, Reinhard G. E., to RUD-Kettenfabrik Rieger & Dietz GmbH u. Co. Connecting device. 4,977,649, Cl. 24-573.100.

Smith, Alan M.: *See—*
Shanks, Ian A.; and Smith, Alan M., 4,978,503, Cl. 422-58.000.

Smith, Bruce N. Spoked wheel. 4,978,176, Cl. 301-104.000.

Smith, Dawn M. Garment pocket dispenser. 4,977,626, Cl. 2-250.000.

Smith, Douglas C., to AT&T Bell Laboratories. Apparatus and method for expanding the frequency range over which electrical signal amplitudes can be accurately measured. 4,978,907, Cl. 324-72.500.

Smith, Glenn G.; and Stapleton, Edward L., to Caterpillar Inc. Load sensing hydraulic system. 4,977,928, Cl. 137-596.000.

Smith, Kenneth C.: *See—*
Chong, Chu P.; Smith, Kenneth C.; and Vranesic, Zvonko G., 4,978,959, Cl. 341-161.000.

Smith, Laurence R.: *See—*
Gesslein, Bruce W.; Guth, Jacob J.; Mintz, Gilbert R.; Reinhart, Gale M.; and Smith, Laurence R., 4,978,526, Cl. 424-70.000.

Smith, Lawrence A., Jr., to Chemical Research & Licensing Company. Method for the preparation of methyl tertiary butyl ether. 4,978,807, Cl. 568-697.000.

Smith, Lawrence C., to Pascal Company, Inc. Sterilizing tray. 4,978,510, Cl. 422-310.000.

Smith & Nephew Textiles Limited: *See—*
Muir, Terence R. M., 4,977,758, Cl. 66-27.000.

Smith, Ronald M.: *See—*
Baum, Richard I.; Borden, Terry L.; Butwell, Justin R.; Clark, Carl E.; Ganek, Alan G.; Lum, James; Mall, Michael G.; Plambeck, Kenneth E.; Scalzi, Casper A.; Schmalz, Richard J.; Smith, Ronald M.; and Thomas, Julian, 4,979,098, Cl. 364-200.000.

Smith, Scott W.: *See—*
Holtey, Thomas O.; Murray, Thomas L., Jr.; Perzan, Wayne A.; and Smith, Scott W., 4,979,104, Cl. 364-200.000.

Smith, Stephen F.: *See—*
Hendrix, Donald E.; and Smith, Stephen F., 4,978,909, Cl. 324-77.00B.

Smith, Ward C.: *See—*
Dole, Charles M.; Webster, Gary L.; and Smith, Ward C., 4,978,502, Cl. 422-58.000.

SmithKline Beecham Corporation: *See—*
Lafferty, John J.; DeMarinis, Robert M.; and Venslavsky, Joseph W., 4,978,660, Cl. 514-215.000.

Smock Material Handling Company, Inc.: *See—*
Smock, William L., 4,977,999, Cl. 198-463.300.

Smock, William L., to Smock Material Handling Company, Inc. Container handler for conveyor system. 4,977,999, Cl. 198-463.300.

Smolinsky, Gerald: *See—*
Andrews, John M., Jr.; Lifshitz, Nadia; and Smolinsky, Gerald, 4,978,915, Cl. 324-158.00R.

Smyrloglou, Eli. Filtered static eliminating blow-off gun. 4,978,371, Cl. 55-102.000.

Snashall, Martin G.; Andrews, Mark R.; and Levy, David F., to Abekas Video Systems Limited. Processing of color video signals. 4,979,022, Cl. 358-22.000.

Snedeker, Colin M., to Binney & Smith Inc. Washable solid marking composition. 4,978,390, Cl. 106-19.000.

Snelgrove, R. Vernon: *See—*
McCullough, Francis P., Jr.; Brewster, Steven L.; Snelgrove, R. Vernon; and Higgins, George C., 4,978,571, Cl. 428-263.000.

Snyder, Campbell H.: *See*—
Buller, Marvin L.; M[illegible], Barbara J.; and Snyder, Campbell H., 4,978,638, Cl. 437-[illegible].000.

Snytro Corporation: *See*—
Walfield, Alan M.; and Pollock, Thomas J., 4,978,623, Cl. 435-320.000.

Sobhani, Seyd M.; and Thomas, Anthony O. High speed electronic circuit breaker. 4,979,068, Cl. 361-18.000.

Societe Anonyme dite : Alcatel Espace: *See*—
Fontanes, Sylvain; Birot, Patrice; Marguinaud, Andre ; Quignon, Thierry; and Romann, Brigitte, 4,979,215, Cl. 381-49.000.

Societe Anonyme dite: Stein Industrie: *See*—
Charbonnel, Alain; and Foucher, Jean-Claude, 4,977,861, Cl. 122-483.000.

Societe des Electrodes & Refractaires Savoie: *See*—
Dumas, Daniel; and Hoynant, George, 4,978,496, Cl. 376-280.000.

Societe Francaise Hoechst: *See*—
Christidis, Yani, 4,978,784, Cl. 562-470.000.

Societe Mancelle de Fonderie: *See*—
Vigouroux, Emile, 4,978,109, Cl. 266-274.000.

Societe Nationale Industrielle et Aerospatiale: *See*—
Perdu, Michel, 4,979,119, Cl. 364-442.000.

Soderberg, Mark: *See*—
Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., 4,979,100, Cl. 364-200.000.

Sofia, Robert D., to Carter-Wallace, Inc. Method for the prevention and control of epileptic seizure. 4,978,680, Cl. 514-534.000.

Solt, Katalin: *See*—
Popovic, Radivoje; Solt, Katalin; and Lienhard, Heinz, 4,979,149, Cl. 365-244.000.

Somero, David W.: *See*—
Quenzi, Philip J.; and Somero, David W., 4,978,246, Cl. 404-84.000.

Song, Joo H., to Wm. Wrigley Jr. Company. Gradual release structures for chewing gum. 4,978,537, Cl. 426-5.000.

Sono-Tek Corporation: *See*—
Berger, Harvey L.; Paul, Alan; and Broe, William J., 4,978,067, Cl. 239-102.200.

Sony Corporation: *See*—
Haraguchi, Shinya; and Nakahara, Kiyonori, 4,979,205, Cl. 379-61.000.
Katsuno, Hiroshi, 4,978,240, Cl. 400-224.200.
Koga, Noriyuki, 4,979,058, Cl. 360-74.200.
Matsumoto, Akihiko; Nagasawa, Fumihiro; and Onozuka, Kuniharu, 4,979,057, Cl. 360-71.000.
Minematsu, Toru; and Nagayama, Haruki, 4,979,028, Cl. 358-85.000.
Shimizume, Kazutoshi; and Kuroda, Hirokazu, 4,979,192, Cl. 375-111.000.

Sorrento Engineering, Inc.: *See*—
Hill, Francis U., 4,978,690, Cl. 521-54.000.

Sotome, Kiyoshi. Method of protecting crops by a non-toxic composition. 4,978,686, Cl. 514-698.000.

Southco, Inc.: *See*—
Bisbing, Robert H., 4,978,152, Cl. 292-169.000.

Southwest Research Institute: *See*—
Kwun, Hegeon; and Burkhardt, Gary L., 4,979,125, Cl. 364-507.000.

Specialty Equipment Companies, Inc.: *See*—
Upton, Ronald D.; Branz, Michael A.; and Richardson, Edmund S., 4,977,754, Cl. 62-248.000.

Spectra-Physics: *See*—
Young, Eddie H. C.; and Jacob, James J., 4,979,176, Cl. 372-13.000.

Spenco Medical Corporation: *See*—
Orchard, Lewis P., 3rd, 4,977,691, Cl. 36-44.000.

Sperber, Henry. Material feeding apparatus using pressurized air. 4,978,252, Cl. 406-64.000.

Spicer, Lyndon R., to Stc Plc. Deployment of towed aircraft decoys. 4,978,086, Cl. 242-107.000.

Spindler, Ernst: *See*—
Haller, Ingo; Spindler, Ernst; Heisler, Manfred; and Kleine, Willi, 4,978,718, Cl. 525-239.000.

Spohn, Ronald F., to Occidental Chemical Corporation. Preparation of halogen substituted phthalic anhydride. 4,978,760, Cl. 549-246.000.

Sporlan Valve Company: *See*—
Lange, Harold T., Sr., 4,978,062, Cl. 236-92.00B.

Sprague, Sherman J., to Mogul Corporation, The. Method for inhibiting scale and corrosion in water systems. 4,978,456, Cl. 210-699.000.

Sprenger, Gerhard; and Dodt, Jurgen, to Gewerkschaft Eisenhutte Westfalia, GmbH. Advanceable mine roof supports. 4,978,248, Cl. 405-292.000.

Spriggs, Donald R.: *See*—
Ritter, Ann M.; Siemers, Paul A.; and Spriggs, Donald R., 4,978,585, Cl. 428-614.000.

Springer, Richard A.: *See*—
Goetz, Howard V.; and Springer, Richard A., 4,978,971, Cl. 346-1.100.

Sprint International Communications Corp.: *See*—
Makris, Perry; Choi, Frederick; Klimek, Mark; Mapp, James; Munemoto, Koji; Nicoll, Jeff; Soderberg, Mark; and Moore, James A., 4,979,100, Cl. 364-200.000.

Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., to Conner Peripherals, Inc. Disk drive system controller architecture utilizing embedded real-time diagnostic monitor. 4,979,055, Cl. 360-69.000.

Squires, John P.; Fiers, Thomas A.; and Shrinkle, Louis J., to Conner Peripherals, Inc. Disk drive system controller architecture. 4,979,056, Cl. 360-69.000.

SRI International: *See*—
Eckerle, Joseph S., 4,977,784, Cl. 73-862.540.

Srivastava, Pramod K.: *See*—
Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., 4,978,782, Cl. 562-125.000.

Stadtfeld, Kerry W.: *See*—
Coleman, Michael D.; and Stadtfeld, Kerry W., 4,978,151, Cl. 292-21.000.

Stahlecker, Fritz, to Stahlecker, Hans, a part interest. Process and a machine arrangement for sliver processing. 4,977,738, Cl. 57-281.000.

Stahlecker, Hans: *See*—
Stahlecker, Fritz, 4,977,738, Cl. 57-281.000.

Stahly, Daniel C., to Eaton Corporation. Engine coolant thermostat with pressure relief feature. 4,978,060, Cl. 236-34.500.

Staley, Glenn L., Jr. Trombones and the like. 4,977,809, Cl. 84-395.000.

Stamicarbon B.V.: *See*—
Kersemakers, Jozef J. F. M.; Meijer, Henricus E. H.; and Martens, Gerardus, 4,978,493, Cl. 264-255.000.

Stamm, Klaus; and Tenhaven, Ulrich, to Hoesch Stahl AG. Resistance-weldable composite. 4,978,582, Cl. 428-551.000.

Stanasolovich, David: *See*—
Nanda, Madan M.; Peterman, Steven L.; and Stanasolovich, David, 4,978,419, Cl. 156-643.000.

Standard Oil Company, The: *See*—
Seely, Michael J.; Friedrich, Maria S.; and Suresh, Dev D., 4,978,764, Cl. 558-319.000.

Standard Products Company, The: *See*—
Jackson, Norman C., 4,978,490, Cl. 264-148.000.

Stansfield, Orlin M.; and Schleicher, Robert W., Jr., to General Atomics. Method of making nuclear fuel compacts. 4,978,480, Cl. 264-0.500.

Stant Inc.: *See*—
Thompson, Robert H.; Szlaga, Emil; and Harris, Robert S., 4,977,936, Cl. 141-312.000.

Stapleton, Edward L.: *See*—
Smith, Glenn G.; and Stapleton, Edward L., 4,977,928, Cl. 137-596.000.

Star Sprinkler Corporation: *See*—
Simons, John R., 4,977,963, Cl. 169-37.000.

Starch, Michael S., to Dow Corning Corporation. Dispersible silicone wash and rinse cycle antifoam formulations. 4,978,471, Cl. 252-174.150.

Stark, Glenn M.: *See*—
McCullough, Robert B.; Taylor, Robert G., Jr.; Stark, Glenn M.; Swinton, William G.; and Fairman, Bruce A., 4,979,054, Cl. 360-48.000.

Staub, Markus: *See*—
Maier, Willy; Bachmann, Thomas; Konrad, Martin; and Staub, Markus, 4,978,117, Cl. 271-206.000.

Stc Plc: *See*—
Spicer, Lyndon R., 4,978,086, Cl. 242-107.000.

Steblovsky, Boris A.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Stec Inc.: *See*—
Ohmi, Tadahiro; Mihara, Hiroshi; and Satoh, Kiyoshi, 4,977,916, Cl. 137-8.000.

Steele, Ronald E.: *See*—
Bowman, Robert M.; Steele, Ronald E.; and Browne, Leslie, 4,978,672, Cl. 514-383.000.

Steen, Raymond, Jr.: *See*—
Warther, Richard O.; and Steen, Raymond, Jr., 4,978,146, Cl. 283-81.000.

Stefansky, Frederick M.; and Bagnell, Glade N., to Conner Peripherals, Inc. Disk drive architecture. 4,979,062, Cl. 360-97.020.

Steffes, Rudolf, to American Standard Inc. Lever handle assembly for sanitary fixtures. 4,977,641, Cl. 16-121.000.

Steiger, Maurice J. Differential drive and steering system. 4,977,970, Cl. 180-6.200.

Steinbeck, Karl G.: *See*—
Newallis, Peter E.; Macke, Jeffrey D.; Steinbeck, Karl G.; and Wasleski, Daniel N., 4,978,795, Cl. 568-56.000.

Steiner, Norman F., to Air Comm Corporation. System and method of heat distribution in engine powered craft. 4,978,064, Cl. 237-12.30A.

Stephens, Berton H. Stereoscopic video system and method with field synchronization and intensity control. 4,979,033, Cl. 358-92.000.

Stephens, Mark L. Self cleaning automatic machine pistol and silencer for the same. 4,977,815, Cl. 89-180.000.

Sterling Drug Inc.: *See*—
Bell, Malcolm R., 4,978,664, Cl. 514-235.200.

Stevenson, Joseph: *See*—
Newcomb, Gary L.; Brandt, Timothy E.; Borden, Scott C.; and Stevenson, Joseph, 4,978,960, Cl. 342-25.000.

Stewart, James J.: *See*—
Brannan, James R.; Bean, Andrew S.; Vaccaro, Anthony J.; and Stewart, James J., 4,978,431, Cl. 204-28.000.

Stiefel, Edward I.: *See*—
Coyle, Catherine L.; Halbert, Thomas R.; and Stiefel, Edward I., 4,978,464, Cl. 252-42.700.

Stierman, Roger J.; Heinen, K. Gail; Ramsey, Thomas; and Haefling, James F., to Texas Instruments Incorporated. Insulated substrate for *flip-chip integrated circuit device.* 4,979,015, Cl. 357-69.000.

Stihl, Andreas: *See—*
Vonderau, Werner; and Grabow, Ralf R., 4,978,478, Cl. 261-35.000.

Stirling Thermal Motors, Inc.: *See—*
Meijer, Roelf J., 4,977,742, Cl. 60-525.000.

StÅlfors, Lennart. Composite camera with automatic parallax correction. 4,978,983, Cl. 354-76.000.

Stober & Morlock, Warmekraft Gesellschaft mbH: *See—*
Erichsen, Volker Y., 4,977,791, Cl. 74-470.000.

Stockham Valve Australia Pty. Ltd.: *See—*
Hocking, Gary A., 4,977,926, Cl. 137-512.100.

Stockrail Limited: *See—*
Duce, Edward, 4,977,996, Cl. 198-349.950.

Stoffel, Gunter: *See—*
Fehling, Guido; and Stoffel, Gunter, 4,977,900, Cl. 128-751.000.

Stohr, Hans; and Mehr, Lothar, to ABB Reaktor GmbH. Device for *measuring the torque of a valve moved by an actuator.* 4,977,782, Cl. 73-862.290.

Stone, Benjamin C., to Mead Corporation, The. Hot roll glosser method with glossing temperature below free air glass transistion temperature of resin utilized. 4,978,560, Cl. 427-366.000.

Storage Technology Corporation: *See—*
Moy, Michael E., 4,979,135, Cl. 364-571.010.

Stork, Karl: *See—*
Fikentscher, Rolf; Greif, Norbert; Oppenlaender, Knut; and Stork, Karl, 4,978,780, Cl. 562-42.000.

Story, Phillip M., to Kerr-McGee Chemical Corporation. Process for preparing high solids slurries. 4,978,396, Cl. 106-436.000.

Stotzel, Gilbert; Fuhrmann, Jorg; and Schneider, Joachim, to Ina Lineartechnik Ohg. Hydrostatic bearing assembly. 4,978,233, Cl. 384-12.000.

Straayer, Ronald J., to Gerber Scientific Instrument Company, The. Laser raster scanner having passive facet tracking. 4,978,184, Cl. 350-6.300.

Strahm, Chris N., to Audio Teknology Incorporated. Balanced output circuit. 4,979,218, Cl. 381-94.000.

Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, to Institute Pasteur; and Centre National de la Recherche Scientifique. Non-radioactive labelled single-stranded probe, method for manufacturing it and method for detecting a specified nucleotide sequence using this probe. 4,978,749, Cl. 536-27.000.

Straub, Stephen W., to Champion Spark Plug Company. Igniter cable connector. 4,978,309, Cl. 439-126.000.

Strecker, Jurgen: *See—*
Pontow, Bernd; Wenning, Hans-Peter; Grimminger, Albert; and Strecker, Jurgen, 4,978,369, Cl. 48-197.00R.

Strom, Peter H.: *See—*
Ingraham, Ronald D.; and Strom, Peter H., 4,978,177, Cl. 303-3.000.

Strong, Frank, to Health Care Products, Inc. Sanitized, disinfected and sporicidal articles, and processes for sanitizing, disinfecting and rendering objects sporicidal. 4,978,530, Cl. 424-413.000.

Struckmann, Holger. Support for book and reading matter. 4,978,096, Cl. 248-451.000.

Stueber, Hans-Guenter: *See—*
Kabelitz, Hans-Peter; Kaiser, Winfried; and Stueber, Hans-Guenter, 4,978,276, Cl. 415-55.300.

Stults, Jeffrey S., to Occidental Chemical Corporation. Method of making halobenzophenones and intermediates thereof. 4,978,798, Cl. 568-316.000.

Sturwold, Robert J., to Cincinnati-Vulcan Company. Sulfurized metal-working lubricants derived from modified natural fats and oils and formulations. 4,978,465, Cl. 252-48.400.

Stypula, Richard J.; and Buckholz, Lawrence, Jr., to International Flavors & Fragrances Inc. Oil-impervious, water retaining, silicon oxide derivative-containing food articles. 4,978,541, Cl. 426-92.000.

Suckewer, Szymon; DiCicco, Darrell S.; Hirschberg, Joseph G.; Meixler, Lewis D.; Sathre, Robert; and Skinner, Charles H., to Princeton X-Ray Laser. X-ray laser microscope apparatus. 4,979,203, Cl. 378-206.000.

Suda, Kazuya: *See—*
Takano, Koshi; and Suda, Kazuya, 4,978,195, Cl. 350-96.270.

Sueda, Minoru: *See—*
Mito, Yoshiki; Sueda, Minoru; Shiota, Hiroshi; and Tashiro, Shozo, 4,977,773, Cl. 72-353.600.

Sugao, Masakazu: *See—*
Kobayashi, Morio; and Sugao, Masakazu, 4,978,612, Cl. 435-10.000.

Sugimoto, Junichi, to Fuji Xerox Co., Ltd. Control device for use with an image recording system. 4,979,132, Cl. 364-520.000.

Sugino, Yoshito, to Sugiyo Co., Ltd. Simulated fish meat and method of producing same. 4,978,551, Cl. 426-573.000.

Sugioka, Takami; Ueno, Toshiyuki; Yudate, Toshihiro; and Kobayashi, Koji, to Teijin Seiki Co., Ltd. Bobbin holder. 4,978,082, Cl. 242-46.400.

Sugita, Akio: *See—*
Kawachi, Masao; Takato, Norio; Jinguji, Kaname; Sugita, Akio; and Sumida, Shin, 4,978,188, Cl. 350-96.120.

Sugiyo Co., Ltd.: *See—*
Sugino, Yoshito, 4,978,551, Cl. 426-573.000.

Suhr, Robert N. Tab forming tape dispenser with tape passing over cutter. 4,978,330, Cl. 493-466.000.

Sullivan, Scott L. Aerosol dispenser and valve. 4,978,038, Cl. 222-402.190.

Sulzer Brothers Limited: *See—*
Frey, Otto; Semlitsch, Manfred; and Weber, Heinz, 4,978,355, Cl. 623-16.000.
Rothlin, Peter, 4,978,818, Cl. 200-406.000.
Schweizer, Sandro, 4,977,955, Cl. 165-170.000.
Tiefenthaler, Edelbert, 4,977,925, Cl. 137-489.500.

Sumida, Kenji: *See—*
Nakaya, Toshitaka; and Sumida, Kenji, 4,978,101, Cl. 251-129.150.

Sumida, Shin: *See—*
Kawachi, Masao; Takato, Norio; Jinguji, Kaname; Sugita, Akio; and Sumida, Shin, 4,978,188, Cl. 350-96.120.

Sumitomo Chemical Company, Limited: *See—*
Haga, Toru; Nagano, Eiki; Sato, Ryo; and Morita, Kouichi, 4,978,787, Cl. 564-218.000.
Matsuda, Teruo; Miki, Masayoshi; and Ochi, Hiromu, 4,978,424, Cl. 156-664.000.
Yuyama, Masahiro; Moritani, Masahiko; and Futagami, Mikio, 4,978,702, Cl. 524-266.000.

Sumitomo Electric Industries, Ltd.: *See—*
Ito, Masumi; Yokota, Hiroshi; Danzuka, Toshio; and Takagi, Masahiro, 4,978,378, Cl. 65-3.120.
Sakamoto, Yoshito, 4,978,693, Cl. 522-137.000.
Takahashi, Kenichi; and Yoshida, Noriyuki, 4,978,376, Cl. 65-3.110.

Sumitomo Heavy Industries, Ltd.: *See—*
Inage, Toyoshi; and Ito, Kiyoshi, 4,977,833, Cl. 101-415.100.

Sumitomo Rubber Industries, Ltd.: *See—*
Ochiai, Kiyoshi, 4,977,942, Cl. 152-209.00B.

Summers, William A., to American Waste Reduction Corporation. Minimization of environmental wastes. 4,977,840, Cl. 110-346.000.

Sumner, William C.: *See—*
Koster, Robert A.; Brondsema, Philip J.; Pennington, Willis J.; Sumner, William C.; and Vilmer, Susan E., 4,978,811, Cl. 568-734.000.

Sun, Jim C.; Boone, Mark B.; Dunbar, James J.; and Weedon, Gene C., to Allied-Signal Inc. Method to extract material from a running *length of fiber.* 4,978,492, Cl. 264-180.000.

Sun, Lee K.: *See—*
Schoemaker, Hubert J. P.; and Sun, Lee K., 4,978,745, Cl. 530-387.000.

Sun, William H.: *See—*
Hofmann, John E.; Sun, William H.; and Luftglass, Bryan K., 4,978,514, Cl. 423-235.000.

Sunada, Tomohiro: *See—*
Hiraoka, Tetsuo; Ohtsuka, Takenori; Hokazono, Kazuaki; Seike, Shinji; and Sunada, Tomohiro, 4,977,865, Cl. 123-52.0MB.

Sundstrand Corporation: *See—*
Huss, John; Hoppe, Richard J.; Crowe, Lawrence E.; Sutrina, Thomas; and Lakin, Eric D., 4,979,090, Cl. 363-141.000.
Rodgers, Colin, 4,978,279, Cl. 415-151.000.

Super M Associates: *See—*
DeRuiter, J. W.; and Butot, Lucas A., 4,978,826, Cl. 219-10.810.

Super X Limited: *See—*
Denne, Phillip R. M., 4,978,299, Cl. 434-58.000.

Suresh, Dev D.: *See—*
Seely, Michael J.; Friedrich, Maria S.; and Suresh, Dev D., 4,978,764, Cl. 558-319.000.

Surgical Specialties, Inc.: *See—*
Hunt, James R., 4,977,893, Cl. 128-157.000.

Surovikin, Vitaly F.; Plaxin, Georgy V.; Semikolenov, Vladimir A.; Likholobov, Vladimir A.; and Tiunova, Ilona J. Porous carbonaceous material. 4,978,649, Cl. 502-416.000.

Suter, Richard R., to AT&E Corporation. Low voltage VCO temperature compensation. 4,978,930, Cl. 331-176.000.

Sutherland, Derek R.: *See—*
Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., 4,978,675, Cl. 514-450.000.

Sutrina, Thomas: *See—*
Huss, John; Hoppe, Richard J.; Crowe, Lawrence E.; Sutrina, Thomas; and Lakin, Eric D., 4,979,090, Cl. 363-141.000.

Suzuki, Akira; Ito, Susumu; Okamoto, Kikuhiko; Hoshino, Eiichi; Yokosuka, Michio; and Murata, Moriyasu, to Kao Corporation. Detergent composition for clothing: containing cellulase enzyme with non-degrading index of 500 or more. 4,978,470, Cl. 252-174.120.

Suzuki, Hideaki: *See—*
Hosoda, Kenji; Suzuki, Hideaki; Kubota, Takaharu; and Nawata, Kiyoshi, 4,978,611, Cl. 435-7.000.

Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; Masubuchi, Takamichi; and Sakama, Masao, to Yamaha Corporation. Angle sensor for musical tone control. 4,977,811, Cl. 84-600.000.

Suzuki, Hideo: *See—*
Kajiwara, Shigeru; Maeda, Hidekatsu; and Suzuki, Hideo, 4,978,619, Cl. 435-182.000.
Umemoto, Akio; Aoki, Yuji; Numata, Katuyosi; and Suzuki, Hideo, 4,979,200, Cl. 378-185.000.

Suzuki, Katsuyuki: *See—*
Morii, Mitsuyoshi; Ohoka, Masaharu; Suzuki, Toshihiko; Suzuki, Katsuyuki; Kawashima, Nobuhiro; Morii, Noriko; and Mori, Kunizo, 4,978,620, Cl. 435-226.000.

Suzuki, Masashiro; and Motoori, Ryuzo, to Nikon Corporation. Video signal processing circuit. 4,979,043, Cl. 358-167.000.

Suzuki, Michio, to Tokyo Electric Co., Ltd. Printer apparatus. 4,979,131, Cl. 364-519.000.

Suzuki, Nobuo: *See—*
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio;

Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Suzuki, Shigeo: *See*—
Shimizu, Ryuichi; Kawanishi, Tsuneaki; Suzuki, Shigeo; Hosaka, Shigeo; Mori, Yasuki; and Narahara, Toshikazu, 4,978,596, Cl. 430-109.000.

Suzuki, Takeshi: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Suzuki, Tomonari; Wada, Hiroshi; Yoshimoto, Yoshikazu; Yoshida, Masaru; and Nakajima, Shigeo, to Sharp Kabushiki Kaisha. Electrode and a method for the production of the same. 4,978,600, Cl. 429-218.000.

Suzuki, Toshihiko: *See*—
Morii, Mitsuyoshi; Ohoka, Masaharu; Suzuki, Toshihiko; Suzuki, Katsuyuki; Kawashima, Nobuhiro; Morii, Noriko; and Mori, Kunizo, 4,978,620, Cl. 435-226.000.

Suzuki, Yasuyuki. Method of forming a coil on a core. 4,977,666, Cl. 29-603.000.

Suzuki, Yoshiyuki; and Aoki, Kunimitsu, to Yazaki Corporation. Display apparatus for a vehicle. 4,978,196, Cl. 350-174.000.

Svec, Paul S.: *See*—
Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,978,039, Cl. 222-592.000.

Svedin, Bjorn H.: *See*—
Norell, Maria; and Svedin, Bjorn H., 4,978,517, Cl. 423-479.000.

Swanstrom, Carl P.: *See*—
Fochtman, Edward G.; Daley, Peter S.; Ader, Milton; Plys, Albert G.; Swanstrom, Carl P.; and Grutsch, James F., 4,977,839, Cl. 110-346.000.

Sweet, James R., to Exxon Research and Engineering Company. Membrane assisted settling process. 4,978,454, Cl. 210-640.000.

Swinton, William G.: *See*—
McCullough, Robert B.; Taylor, Robert G., Jr.; Stark, Glenn M.; Swinton, William G.; and Fairman, Bruce A., 4,979,054, Cl. 360-48.000.

Sylvester, Richard J.: *See*—
Beattie, Patrick J.; Oliveri, Andrew L.; and Sylvester, Richard J., 4,977,766, Cl. 70-326.000.

SymBiotech Incorporated: *See*—
Coughlin, Robert W.; and Davis, Edward M., 4,978,650, Cl. 502-432.000.

Synthes (U.S.A.): *See*—
Frigg, Robert, 4,978,349, Cl. 606-67.000.

Syring, Paul G.: *See*—
Dahl, Dean R.; and Syring, Paul G., 4,978,134, Cl. 280-491.400.

Szablikowski, Klaus: *See*—
Wilke, Michaela; Szablikowski, Klaus; and Balser, Klaus, 4,978,750, Cl. 536-114.000.

Szala, Lawrence E.: *See*—
Brun, Milivoj K.; Borom, Marcus P.; Miller, Steven A.; Szala, Lawrence E.; and Svec, Paul S., 4,978,039, Cl. 222-592.000.

Szlaga, Emil: *See*—
Thompson, Robert H.; Szlaga, Emil; and Harris, Robert S., 4,977,936, Cl. 141-312.000.

Szmuszkovicz, Jacob, to Upjohn Company, The. 7-phenylpyrimido[1,2-alpha][1,4]benzodiazepin-3(5H)-ones. 4,978,753, Cl. 540-559.000.

Tabata, Fumio; Sekiguchi, Hidenori; Kamada, Toru; and Sakata, Yuji, to Fujitsu Limited. Vertical stepper. 4,979,195, Cl. 378-34.000.

Tachi, Kazuo: *See*—
Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, 4,978,962, Cl. 342-351.000.

Tachi-S Co., Ltd.: *See*—
Kubo, Yoshiaki; and Toya, Sinichi, 4,978,158, Cl. 296-65.100.
Takizawa, Kiyotaka, 4,977,973, Cl. 180-271.000.

Tachikawa Corp.: *See*—
Inanuma, Minoru; Ohara, Shumpei; Sano, Yukio; Goto, Akihiro; Sasamoto, Shinji; Kaneko, Eiji; Miyao, Takashi; Torii, Yukio; Umemoto, Keijiro; Hirako, Ryo; Suzuki, Nobuo; and Shingu, Tadashi, 4,978,181, Cl. 350-1.700.

Tahara, Yoshifumi: *See*—
Aoki, Makoto; Tahara, Yoshifumi; and Arai, Izumi, 4,978,412, Cl. 156-345.000.

Takada, Norihisa; Kojima, Saburo; Wakayama, Tadaaki; Omi, Kyoko; Kobayashi, Nobuyuki; and Okada, Hideyuki, to Kikko Foods Corporation. Method for producing tomato products. 4,978,549, Cl. 426-489.000.

Takagawa, Ryozo; Tanabe, Hisaki; Asakura, Koji; Yamada, Mitsuo; Ohsugi, Hiroharu; Mizuguchi, Ryuzo; and Eguchi, Yoshio. Novel polymerizable vinyl monomers and vinyl resins prepared therefrom. 4,978,777, Cl. 560-224.000.

Takagi, Hiroaki: *See*—
Nishi, Yozo; and Takagi, Hiroaki, 4,977,790, Cl. 74-479.000.

Takagi, Masahiro: *See*—
Ito, Masumi; Yokota, Hiroshi; Danzuka, Toshio; and Takagi, Masahiro, 4,978,378, Cl. 65-3.120.

Takagi, Yoshihiro: *See*—
Inoue, Nobuaki; Yagihara, Morio; and Takagi, Yoshihiro, 4,978,603, Cl. 430-265.000.

Takahara, Eimei, to Kabushiki Kaisha Toshiba. Single phase to three phase rectifier/inverter with DC ripple compensation. 4,978,894, Cl. 318-768.000.

Takahara, Ikuya: *See*—
Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, 4,978,886, Cl. 313-414.000.

Takahashi, Akihiko: *See*—
Hamuro, Mitsuroh; Hata, Yoshitaka; Hayashi, Shigeo; and Takahashi, Akihiko, 4,978,913, Cl. 324-158.00F.

Takahashi, Akira, to Fuji Jukogyo Kabushiki Kaisha. Method and device for controlling rear-wheel steering of automotive vehicle. 4,979,115, Cl. 364-424.050.

Takahashi, Akira, to Fuji Jukogyo Kabushiki Kaisha. Method and device for rear wheel steering system of automotive vehicle. 4,979,116, Cl. 364-424.050.

Takahashi, Harumi, to Ricoh Company, Ltd. Image forming apparatus having means for detecting loaded unit. 4,978,995, Cl. 355-206.000.

Takahashi, Hidehiko, to Yakurigaku Chuo Kenkyusho. Novel synthetic aluminum silicate preparation. 4,978,536, Cl. 424-684.000.

Takahashi, Hideo: *See*—
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Takahashi, Ikuo: *See*—
Kanno, Tatsuya; Takahashi, Ikuo; Sasaki, Kenichi; Iguichi, Yoshihiro; and Fukuda, Yutaka, 4,978,578, Cl. 428-412.000.

Takahashi, Keiko: *See*—
Yamada, Youichi; and Takahashi, Keiko, 4,979,212, Cl. 381-45.000.

Takahashi, Kenichi; and Yoshida, Noriyuki, to Sumitomo Electric Industries, Ltd. Crystalline optical fiber and its method of manufacture. 4,978,376, Cl. 65-3.110.

Takahashi, Kenichi: *See*—
Nagata, Atsushi; Uekawa, Yutaka; Senoo, Takanori; and Takahashi, Kenichi, 4,979,210, Cl. 380-3.000.

Takahashi, Kousuke, to NEC Corporation. Apparatus for retrieving character strings. 4,979,101, Cl. 364-200.000.

Takahashi, Masahiko, to Fuji Jukogyo Kabushiki Kaisha. Transmission ratio control system for a continuously variable transmission. 4,977,798, Cl. 74-867.000.

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Oshita, Saiichiro; Mouri, Toyohiko; and Takahashi, Tsutomu, 4,979,114, Cl. 364-424.050.

Takahashi, Yoshiaki: *See*—
Miyamoto, Satoru; Takahashi, Yoshiaki; Shirai, Katsuyuki; Takahara, Ikuya; and Endo, Satoru, 4,978,886, Cl. 313-414.000.

Takahashi, Yuho: *See*—
Kishimoto, Shin; Morimoto, Toshihide; Nobuaki, Kakimori; Takahashi, Yuho; and Ohsaki, Morihide, 4,978,224, Cl. 356-394.000.

Takahashi, Yutaka; Noguchi, Yoshihiro; Yanagida, Takahiro; and Imai, Tomohisa, to Mitsubishi Denki Kabushiki Kaisha; and Mitsubishi Electric Home Appliance Co., Ltd. Floor detector for vacuum cleaners. 4,977,639, Cl. 15-319.000.

Takai, Yasuo: *See*—
Takashige, Masao; Iwai, Teruyuki; Takeichi, Hidenobu; Takai, Yasuo; Sasaki, Yoshinori; Masuoka, Masato; and Ohki, Yuichi, 4,978,484, Cl. 264-40.100.

Takaishi, Naotake: *See*—
Motegi, Itsuro; Kawai, Michio; Imokawa, Genji; Nakamura, Koichi; and Takaishi, Naotake, 4,978,523, Cl. 424-59.000.

Takanashi, Kazuhiro: *See*—
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.

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Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, 4,977,989, Cl. 192-56.00R.

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Machida, Kaoru; Kikuchi, Yusichi; Takano, Masayuki; and Kobayashi, Noriyoshi, 4,977,780, Cl. 73-644.000.

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Nanyoshi, Yasutoshi; and Takase, Sadao, 4,977,876, Cl. 123-333.000.

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Kawachi, Masao; Takato, Norio; Jinguji, Kaname; Sugita, Akio; and Sumida, Shin, 4,978,188, Cl. 350-96.120.

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Ukyo, Yoshio; Wada, Shigetaka; and Takatori, Kazumasa, 4,978,645, Cl. 501-98.000.

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Sekino, Naomi; Takayama, Shuichi; Tsukaya, Takashi; Gotanda, Masakazu; Kubota, Tetsumaru; Uchiyama, Naoki; Ishihara,

Koichiro; Kami, Kuniaki; Murata, Akira; and Hayashi, Masaaki, 4,977,902, Cl. 128-804.000.

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Arima, Jiro; Tsujimura, Hiroji; Narita, Tomonori; and Takebuchi, Hiroki, 4,979,134, Cl. 364-557.000.

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Goto, Giichi; Ohkawa, Shigenori; and Fukuda, Naohisa, 4,978,761, Cl. 549-462.000.
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Edahiro, Takeshi; Kumada, Hiroyoshi; Morita, Toshiki; Takehara, Shin; and Shibata, Mineharu, 4,978,135, Cl. 280-707.000.

Takeichi, Hidenobu: *See*—
Takashige, Masao; Iwai, Teruyuki; Takeichi, Hidenobu; Takai, Yasuo; Sasaki, Yoshinori; Masuoka, Masato; and Ohki, Yuichi, 4,978,484, Cl. 264-40.100.

Takeuchi, Akihiro: *See*—
Aki, Shinichi; Kobayashi, Masaaki; Muraji, Tsutomu; and Takeuchi, Akihiro, 4,979,046, Cl. 358-330.000.

Takeuchi, Koichi: *See*—
Ibi, Akira; Kitagawa, Masanori; Sagawa, Eiichi; Takeuchi, Koichi; and Ohkawado, Etsuo, 4,978,754, Cl. 544-176.000.

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Takigawa, Shogo; Yusa, Seiichi; and Futagi, Eiji, 4,977,997, Cl. 198-374.000.

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Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, 4,978,681, Cl. 514-557.000.

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Nagata, Teruyuki; Tamaki, Akihiro; Watanabe, Katsuzi; and Yamaguchi, Akihiro, 4,978,792, Cl. 564-384.000.

Tamura, Toshiyuki: *See*—
Ogawa, Minoru; Sakamoto, Koichiro; Tamura, Toshiyuki; and Katsuumi, Kazushige, 4,979,007, Cl. 357-30.000.

Tamura, Yasuyuki: *See*—
Ishikawa, Noriyoshi; Inui, Toshiharu; Tamura, Yasuyuki; and Harada, Toshiaki, 4,978,968, Cl. 346-1.100.

Tanabe, Hisaki: *See*—
Takagawa, Ryozo; Tanabe, Hisaki; Asakura, Koji; Yamada, Mitsuo; Ohsugi, Hiroharu; Mizuguchi, Ryuzo; and Eguchi, Yoshio, 4,978,777, Cl. 560-224.000.

Tanaka, David D.: *See*—
Yin, Khin S.; Virgadamo, Michael J.; Tanaka, David D.; and Banuelos, Angel F., 4,978,593, Cl. 430-2.000.

Tanaka, Hirokazu: *See*—
Hisada, Yasumasa; Tachi, Kazuo; Imatani, Toshio; Tanaka, Hirokazu; Inahata, Hiroyuki; and Noguchi, Tatsuhiro, 4,978,962, Cl. 342-351.000.

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Ikebe, Masaru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, 4,979,065, Cl. 360-133.000.

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Tanikawa, Keizo; Sakoda, Ryozo; Shikada, Ken-ichi; and Tanaka, Sakuya, 4,978,665, Cl. 514-247.000.

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Kimoto, Kiyoshi; and Tanaka, Shinichi, 4,979,162, Cl. 369-116.000.

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Kurokawa, Toru; Watanabe, Hiroyuki; Tanaka, Shoichi; and Mitsui, Fumito, 4,978,552, Cl. 426-559.000.

Tanaka, Tomohide: *See*—
Ito, Michiyasu; Ishii, Toshiyuki; Matumura, Shuji; Mushika, Hajime; and Tanaka, Tomohide, 4,978,486, Cl. 264-41.000.

Tanaka, Toshinori: *See*—
Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, 4,978,874, Cl. 310-83.000.

Tandon Corporation: *See*—
McCullough, Robert B.; Taylor, Robert G., Jr.; Stark, Glenn M.; Swinton, William G.; and Fairman, Bruce A., 4,979,054, Cl. 360-48.000.

Tandy Electronic Japan, Ltd.: *See*—
Tanigawa, Takashi, 4,979,060, Cl. 360-92.000.

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Iwasaki, Katsunori; Tanigawa, Shigeho; and Tokunaga, Masaaki, 4,978,398, Cl. 148-101.000.

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Yasutomi, Sueharu; and Taniguchi, Morimasa, 4,977,799, Cl. 81-53.200.

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Nakahara, Toshiaki; and Tanikawa, Hirohide, 4,978,597, Cl. 430-122.000.

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Kusano, Chushiro; Tanoue, Tomonori; and Mitani, Katsuhiko, 4,979,009, Cl. 357-34.000.

Tao, Ryuji: *See*—
Shindo, Isao; Tao, Ryuji; and Ozawa, Kyoichi, 4,977,776, Cl. 73-1.00G.

Taparauskas, Paul A.: *See*—
Paquette, Edward L.; Riley, William C.; Taparauskas, Paul A.; and Warren, James W., 4,979,019, Cl. 357-80.000.

Tarun, Alexandr P.: *See*—
Chachin, Viktor N.; Khomich, Nikolai S.; Druzhinin, Lel K.; Shlepov, Igor A.; Dulgier, Rostislav O.; Steblovsky, Boris A.; Budnik, Viktor P.; Morozov, Nikolai P.; Babuk, Vitaly V.; and Tarun, Alexandr P., 4,977,707, Cl. 51-18.000.

Tasaka, Naoyasu: *See*—
Murase, Kazuyuki; and Tasaka, Naoyasu, 4,979,172, Cl. 371-16.100.

Tashiro, Shozo: *See*—
Mito, Yoshiki; Sueda, Minoru; Shiota, Hiroshi; and Tashiro, Shozo, 4,977,773, Cl. 72-353.600.

Tatano, Toshio: *See*—
Aoyama, Norihito; Miike, Akira; Shimizu, Yoshiaki; and Tatano, Toshio, 4,978,615, Cl. 435-25.000.

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Seki, Masaki; and Tatsumi, Haruhiko, 4,979,128, Cl. 364-513.000.

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Yamada, Takeshi; Onodera, Tsutomu; and Taya, Hiroyuki, 4,978,201, Cl. 350-320.000.

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Billman, Timothy B.; and Taylor, Attalee S., 4,978,307, Cl. 439-83.000.

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George, John W.; and Taylor, Laurence D., 4,978,028, Cl. 220-403.000.

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McCullough, Robert B.; Taylor, Robert G., Jr.; Stark, Glenn M.; Swinton, William G.; and Fairman, Bruce A., 4,979,054, Cl. 360-48.000.

TDK Corporation: *See*—
Ikebe, Masaru; Shiba, Haruo; Tanaka, Kimio; and Akaoka, Kenkichi, 4,979,065, Cl. 360-133.000.

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Labouze, Joseph; and Teboul, Pierre, 4,978,339, Cl. 604-110.000.

Technicon Instruments Corporation: *See*—
Cremins, John F.; Kim, Young R.; Malin, Michael J.; and Sclafani, Louis D., 4,978,624, Cl. 436-17.000.

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Hauge, Douglas, 4,978,953, Cl. 340-825.160.
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Rambold, Adolf, 4,977,728, Cl. 53-567.000.
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Teijin Limited: *See*—
Hosoda, Kenji; Suzuki, Hideaki; Kubota, Takaharu; and Nawata, Kiyoshi, 4,978,611, Cl. 435-7.000.
Ikegami, Shiro; Torizawa, Yasuhiro; and Kurozumi, Seizi, 4,978,775, Cl. 560-119.000.
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Sugioka, Takami; Ueno, Toshiyuki; Yudate, Toshihiro; and Kobayashi, Koji, 4,978,082, Cl. 242-46.400.
Teikoku Tsushin Kogyo Co., Ltd.: *See*—
Yagi, Nobuyuki; Inagaki, Jiroh; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, 4,978,491, Cl. 264-154.000.
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Rumbaugh, Scott H.; Jones, Michael D.; and Bos, Philip J., 4,979,235, Cl. 455-616.000.
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Telefunken electronic GmbH: *See*—
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Hausman, Kristen A.; Gaudenzi, Gene J.; Mosley, Joseph M.; and Tempest, Susan L., 4,978,927, Cl. 331-57.000.
Temple University of the Commonwealth System of Higher Education: *See*—
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Teng, Clarence: *See*—
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.
Tenhaven, Ulrich: *See*—
Stamm, Klaus; and Tenhaven, Ulrich, 4,978,582, Cl. 428-551.000.
Terada, Naofumi: *See*—
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.
Terayama, Satoshi: *See*—
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 4,977,797, Cl. 74-866.000.
Ternes Register Systems: *See*—
Harder, Willard J., 4,977,683, Cl. 33-621.000.
Ternynck, Therese: *See*—
Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, 4,978,749, Cl. 536-27.000.
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Terrell, William L.: *See*—
Advani, Hira; and Terrell, William L., 4,979,107, Cl. 364-200.000.
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Sanderson, John R.; Marquis, Edward T.; and Payton, Howard F., 4,978,799, Cl. 568-385.000.
Sanderson, John R.; Marquis, Edward T.; and Knifton, John F., 4,978,800, Cl. 568-385.000.
Texaco Inc.: *See*—
Marrelli, John D., 4,977,915, Cl. 137-4.000.
Texas Instruments Incorporated: *See*—
Amador, Gonzalo, 4,978,050, Cl. 228-4.500.
Brighton, Jeffrey E., 4,979,010, Cl. 357-34.000.
Bryans, Mark A.; Cline, James H.; Frazee, Francis B.; and Lehman, Lark E., 4,979,185, Cl. 375-20.000.
Darley, Henry M., 4,979,140, Cl. 364-786.000.
Esquivel, Agerico L.; Mitchell, Allan T.; and Tigelaar, Howard L., 4,979,004, Cl. 357-23.500.
Mahant-Shetti, Shivaling S.; Aton, Thomas J.; and Gale, Rebeca J., 4,978,908, Cl. 324-158.00R.
Manns, William G.; Wood, Anthony B.; and Norwood, David A., 4,979,223, Cl. 382-8.000.
Mitchell, Allan T., 4,979,005, Cl. 357-235.000.
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.
Stierman, Roger J.; Heinen, K. Gail; Ramsey, Thomas; and Haefling, James F., 4,979,015, Cl. 357-69.000.
Textilmaschinenfabrik Dr. Ernst Fehrer Aktiengesellschaft: *See*—
Pum, Hannes, 4,977,653, Cl. 28-115.000.
Textron Inc.: *See*—
Chaplin, John B.; Moore, Robert G.; and Ryken, John M., 4,978,320, Cl. 440-052.000.
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Rialan, Joseph; and Thierry, Gerard, 4,979,152, Cl. 367-77.000.
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Rietter, Josef; Tyukodi, Istvan; and Schindler, Reinhard, 4,977,888, Cl. 128-24.00A.
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Army: *See*—
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Energy: *See*—
Arnold, George W., Jr.; Ashby, Carol I. H.; and Brannon, Paul J., 4,978,418, Cl. 156-628.000.
Bieg, Lothar F., 4,977,777, Cl. 73-37.500.
Brannon, Paul J.; and Cowgill, Donald F., 4,978,893, Cl. 315-150.000.
Granata, Samuel J., Jr.; and Woodle, Boyd M., 4,978,590, Cl. 429-35.000.
Maimoni, Arturo, 4,978,509, Cl. 422-245.000.
Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., 4,978,647, Cl. 502-7.000.
Wright, Maynard K., 4,978,591, Cl. 429-35.000.
Navy: *See*—
Ancona, Mario, 4,978,928, Cl. 331-107.00G.
Farber, Bruce; Kunsemiller, John; and Barradas, Scott, 4,977,966, Cl. 173-159.000.
Ferrando, William A.; Divecha, Amarnath P.; and Karmarkar, Subhash D., 4,978,054, Cl. 228-194.000.
Johnson, Nancy C.; Gill, Robert C.; Leahy, John F.; Gotzmer, Carl, Jr.; Fillman, Harold T.; and , 4,978,482, Cl. 264-3.100.
Lapota, David; Mastny, Gary F.; and Copeland, Hugh D., 4,978,854, Cl. 250-361.00C.
Shoemaker, Patrick A., 4,978,873, Cl. 307-498.000.
U.S. Philips Corporation: *See*—
Carey Smith, Christopher M.; and Vreeswijk, Franciscus W. P., 4,979,036, Cl. 358-105.000.
Courtois, Pierre-Jacques F.; Scheys, Guy F. J.; and Semal, Pierre-Nicholaas W., 4,979,168, Cl. 370-95.100.
Dijken, Reinder H., 4,978,878, Cl. 310-268.000.
Klos-Hein, Karl; and Rumpf, Horst H., 4,977,787, Cl. 74-54.000.
Knapp, Alan G., 4,978,951, Cl. 340-784.000.
Pfennings, Leonardus C. M. G., 4,978,867, Cl. 307-296.600.
Verhagen, Johannes P. C. M., 4,979,161, Cl. 369-77.200.

U.S. Phillips Corporation: *See—*
Van Vliet, Johannes A. J. M.; and Van Esveld, Hendrik A., 4,978,884, Cl. 313-25.000.
United States Surgical Corporation: *See—*
Green, David T., 4,978,049, Cl. 227-178.000.
United Technologies Automotive Inc.: *See—*
Johnston, Thomas K., 4,978,474, Cl. 252-500.000.
United Technologies Corporation: *See—*
Lamm, Foster P., 4,978,558, Cl. 427-250.000.
Madden, Thomas J.; Schlein, Barry C.; and Wagner, W. Barry, 4,977,740, Cl. 60-39.463.
Universite Laval: *See—*
Fortin, J. Andre ; and Thomas, Laurence, 4,977,702, Cl. 47-1.100.
University of California, Regents of the: *See—*
Mishell, Robert; and Usinger, William, 4,978,622, Cl. 435-274.000.
University of Colorado Foundation, Inc.: *See—*
Pankove, Jacques I., 4,979,002, Cl. 357-17.000.
University of Florida: *See—*
Clark, David E.; and Krabill, Robert H., 4,978,410, Cl. 156-325.000.
Crane, Carl D., III; and Haukoos, Dana S., 4,977,971, Cl. 180-8.300.
Green, Alex E. S.; Green, Bruce A. S.; and Wagner, John C., 4,978,367, Cl. 44-281.000.
University of Lowell: *See—*
Douglas, Craig, 4,978,564, Cl. 428-71.000.
University of Minnesota, Regents of the: *See—*
Budd, Jeffrey R., 4,977,889, Cl. 128-30.200.
University of Pittsburgh: *See—*
Ballou, Byron T., 4,978,520, Cl. 424-1.100.
University of Toronto Innovations Foundation: *See—*
Chong, Chu P.; Smith, Kenneth C.; and Vranesic, Zvonko G., 4,978,959, Cl. 341-161.000.
Woodhams, Raymond T., 4,978,698, Cl. 524-62.000.
Unno, Ryoichi: *See—*
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.
Uphoff, Russel L.: *See—*
Schwarzschild, Jack; Uphoff, Russel L.; and Miller, Christopher G., 4,977,898, Cl. 128-662.060.
Upjohn Company, The: *See—*
Kelly, Robert C.; Warpehoski, Martha A.; and Wierenga, Wendell, 4,978,757, Cl. 548-421.000.
Rector, Douglas L.; Conder, George A.; and Folz, Sylvester D., 4,978,670, Cl. 514-345.000.
Szmuszkovicz, Jacob, 4,978,753, Cl. 540-559.000.
Upton, Ronald D.; Branz, Michael A.; and Richardson, Edmund S., to Specialty Equipment Companies, Inc. Next-to-be-purchased cold beverage merchandiser. 4,977,754, Cl. 62-248.000.
Urakawa, Makoto: *See—*
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.
Ury, Michael G., to Fusion Systems Corporation. Electrodeless lamp system with controllable spectral output. 4,978,891, Cl. 315-117.000.
Ushiki, Hiroshi, to Kabushiki Kaisha Toshiba. Electronic device with key switch. 4,979,147, Cl. 365-189.040.
Ushio, Kouichi: *See—*
Edahiro, Takeshi; Kanai, Seita; and Ushio, Kouichi, 4,978,131, Cl. 280-91.000.
Usinger, William: *See—*
Mishell, Robert; and Usinger, William, 4,978,622, Cl. 435-274.000.
USUI Kokusai Sangyo Kaisha Ltd.: *See—*
Kimura, Sadao, 4,977,771, Cl. 72-218.000.
Usui, Toshinao: *See—*
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.
Vaccaro, Anthony J.: *See—*
Brannan, James R.; Bean, Andrew S.; Vaccaro, Anthony J.; and Stewart, James J., 4,978,431, Cl. 204-28.000.
Vadnay, Laszlo. Apparatus for dehusking grain. 4,978,078, Cl. 241-74.000.
Vail, David K., Jr.: *See—*
Seefeldt, David F.; Iacoponi, Michael J.; and Vail, David K., Jr., 4,978,633, Cl. 437-51.000.
Valent, James A.: *See—*
Goddard, Joan S.; Overby, Wayne A.; and Valent, James A., 4,978,849, Cl. 250-235.000.
Valeo: *See—*
Casse, Pierre, 4,978,324, Cl. 464-68.000.
Valeo Thermique Moteur: *See—*
Potier, Michel; and Briet, Gilles, 4,977,954, Cl. 165-76.000.
Valeo Vision: *See—*
Philippe, Eric, 4,978,264, Cl. 411-26.000.
Valley Grain Products, Inc.: *See—*
Cope, Johanthan C.; Davis, Alan E.; Pitman, William B.; and Row, Kathy M., 4,978,548, Cl. 426-439.000.
Valleylab, Inc.: *See—*
Broadwin, Alan; and Kleesattel, Claus, 4,978,333, Cl. 604-22.000.
Vamatex S.p.A.: *See—*
Pezzoli, Luigi, 4,977,932, Cl. 139-449.000.
Vandenbroeck, Patrick G.: *See—*
Mini, Anna M.; and Vandenbroeck, Patrick G., 4,978,021, Cl. 220-8.000.
van den Heuvel, Anthony P.: *See—*
Kotzin, Michael D.; van den Heuvel, Anthony P.; Crisler, Kenneth J.; Hiben, Bradley M.; Mohl, Lawrence M.; and Poulin, Mark R., 4,979,188, Cl. 375-34.000.
Vanderbilt University: *See—*
Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., 4,978,782, Cl. 562-125.000.
Vanderboegh, Ronald A.: *See—*
Amstutz, Douglas D.; and Vanderboegh, Ronald A., 4,979,078, Cl. 362-125.000.
van der Merwe, Jacobus C.; and van der Merwe, Lucas C. Vehicle with telescopic boom for power driven plant trimming tools. 4,977,674, Cl. 30-379.500.
van der Merwe, Lucas C.: *See—*
van der Merwe, Jacobus C.; and van der Merwe, Lucas C., 4,977,674, Cl. 30-379.500.
Van Esveld, Hendrik A.: *See—*
Van Vliet, Johannes A. J. M.; and Van Esveld, Hendrik A., 4,978,884, Cl. 313-25.000.
Van Gent, Stanley L., to Allergan, Inc. Haptic to optic attachment for a soft IOL. 4,978,354, Cl. 623-6.000.
Van Gilder, Derek R.: *See—*
Dysarz, Edward D.; and Van Gilder, Derek R., 4,978,343, Cl. 604-195.000.
Vanguard Group of Printing Companies, The: *See—*
Warther, Richard O.; and Steen, Raymond, Jr., 4,978,146, Cl. 283-81.000.
Van Vliet, Johannes A. J. M.; and Van Esveld, Hendrik A., to U.S. Phillips Corporation. Metal halide discharge lamp having low color temperature and improved color rendition. 4,978,884, Cl. 313-25.000.
Vapor Technologies Inc.: *See—*
Pinkahsov, Eduard, 4,978,556, Cl. 427-37.000.
VDO Adolf Schindling AG: *See—*
Hartmann, Ralf; and Reus, Jurgen, 4,978,865, Cl. 307-140.000.
Veba OEL Entwicklungs-Gesellschaft mbH: *See—*
Pontow, Bernd; Wenning, Hans-Peter; Grimminger, Albert; and Strecker, Jurgen, 4,978,369, Cl. 48-197.00R.
Vegla Vereinigte Glaswerke GmbH: *See—*
Gillner, Manfred; Wlaschitsch, Josef; and Nuding, Werner, deceased, 4,978,207, Cl. 350-631.000.
Veith, Gustav, to Alcatel N.V. Servo-controlled light coupling between a light-emitting component and an optical fiber. 4,978,190, Cl. 350-96.180.
Venkataswamy, Krishna; Waack, Richard; Novich, Bruce E.; and Halloran, John W., to Ceramics Process Systems Corporation. Forming whisker reinforced sintered ceramics with polymerizable binder precursors. 4,978,643, Cl. 501-94.000.
Vennik, Joost: *See—*
Chambaere, Daniel; Coppens, Wilfred; Lievens, Hugo; De Gryse, Roger; Hoogewijs, Robert; Vennik, Joost; and Fiermans, Lucien, 4,978,586, Cl. 428-625.000.
Venslavsky, Joseph W.: *See—*
Lafferty, John J.; DeMarinis, Robert M.; and Venslavsky, Joseph W., 4,978,660, Cl. 514-215.000.
Verax Corporation: *See—*
Dean, Robert C., Jr.; Grela, Peter V.; Karkare, Subhash B.; and Runstadler, Peter W., Jr., 4,978,616, Cl. 435-70.300.
Verhagen, Johannes P. C. M., to U.S. Philips Corporation. Disc-record player with a loading device for loading a disc into the record player. 4,979,161, Cl. 369-77.200.
Verstrate, Gary W.: *See—*
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,978,720, Cl. 525-288.000.
Vetco Gray Inc.: *See—*
Henderson, Herman O., Jr.; and Henneke, Mark Q., 4,978,147, Cl. 285-2.000.
Vetter, Kurt; Baumann, Michael; and Hezel, Thomas, to Behr Industrieanlangen GmbH & Co. Process and device for cleaning a sprayer. 4,977,911, Cl. 134-34.000.
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Victor Company of Japan, Ltd.: *See—*
Ichinoi, Yutaka, 4,979,025, Cl. 358-40.000.
Vieille Montagne France S.A.: *See—*
Blosseville, Patrick; and Dubrac, Claude, 4,977,721, Cl. 52-410.000.
Vigg, Peter A.: *See—*
Ray, Eric T.; and Vigg, Peter A., 4,977,907, Cl. 131-290.000.
Vigouroux, Emile, to Societe Mancelle de Fonderie. Unitary construction multideck tray device for heat treatment of shafts or like members. 4,978,109, Cl. 266-274.000.
Villa, Flavio: *See—*
Siligoni, Marco; and Villa, Flavio, 4,979,008, Cl. 357-34.000.
Vilmer, Susan E.: *See—*
Koster, Robert A.; Brondsema, Philip J.; Pennington, Willis J.; Sumner, William C.; and Vilmer, Susan E., 4,978,811, Cl. 568-734.000.
Vincent, Gary A.; and Meyer, Daniel F., to Dow Corning Corporation. Silicone water block for electrical cables. 4,978,694, Cl. 523-173.000.
Virgadamo, Michael J.: *See—*
Yin, Khin S.; Virgadamo, Michael J.; Tanaka, David D.; and Banuelos, Angel F., 4,978,593, Cl. 430-2.000.

Vishnevetsky, Philip. Device for supporting a toothpaste container. 4,978,034, Cl. 222-102.000.

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Ong, Alex, 4,977,632, Cl. 5-413.000.

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Vo Quang, Tuyen: *See*—
Stratis, Avrameas; Sakamoto, Hiroshi; Traincard, Francois; Vo Quang, Tuyen; Guesdon, Jean-Luc; and Ternynck, Therese, 4,978,749, Cl. 536-27.000.

Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H.: *See*—
Hulek, Anton; Koller, Werner; and Auer, Kurt, 4,978,107, Cl. 266-201.000.

Vogel, Richard M., to Eastman Kodak Company. Apparatus for correcting shading effects in video images. 4,979,042, Cl. 358-163.000.

Vokins, Ian M.: *See*—
Ball, Martin F.; and Vokins, Ian M., 4,978,056, Cl. 229-123.200.

Volker, Theodor; and Althaus, Hans, to Lonza Ltd. Substituted P,P'-methylene-bis-aniline. 4,978,791, Cl. 564-335.000.

Volpe, Luke R., Jr.; and Thomas, Lowell E., to Dynamics Research Corporation. Modular thermal print head and method of fabrication. 4,978,972, Cl. 346-76.0PH.

Von Duprin, Inc.: *See*—
Coleman, Michael D.; and Stadtfeld, Kerry W., 4,978,151, Cl. 292-21.000.

Vonalt, Kerry G., to Aro Corporation, The. Primer valve for chop-check pump. 4,978,283, Cl. 417-511.000.

Von Blucher, Hasso: *See*—
Von Blucher, Hubert; Von Blucher, Hasso; and De Ruiter, Ernest, 4,978,460, Cl. 252-2.000.

Von Blucher, Hubert; Von Blucher, Hasso; and De Ruiter, Ernest. Aqueous swollen macromolecule-containing system as water for firefighting. 4,978,460, Cl. 252-2.000.

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Vonk, Glenn P.: *See*—
Wagner, Daniel B.; Vonk, Glenn P.; and Mercolino, Thomas J., 4,978,625, Cl. 436-518.000.

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Voorhees, Richard W.: *See*—
Bush, Gregory F.; Keener, Don S.; Morel, Jeanne E.; and Voorhees, Richard W., 4,979,148, Cl. 365-230.010.

Vora, Rohitkumar H., to Hoechst Celanese Corp. Copolyimides derived from 2,2-bis (amino phenyl) hexofluoropropane. 4,978,737, Cl. 528-220.000.

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Vora, Rohitkumar H.: *See*—
Mueller, Werner H.; Vora, Rohitkumar H.; and Khanna, Dinesh N., 4,978,738, Cl. 528-220.000.

Vranesic, Zvonko G.: *See*—
Chong, Chu P.; Smith, Kenneth C.; and Vranesic, Zvonko G., 4,978,959, Cl. 341-161.000.

Vreeswijk, Franciscus W. P.: *See*—
Carey Smith, Christopher M.; and Vreeswijk, Franciscus W. P., 4,979,036, Cl. 358-105.000.

VTI, Inc.: *See*—
Silva, Robert M., deceased; Orazio, Fred D., Jr.; and Sledge, Robert B., Jr., 4,978,862, Cl. 250-572.000.

Vukovich, Milan, Jr., to Edward Orton Jr., Ceramic Foundation. Kiln with ventilation system. 4,978,295, Cl. 432-120.000.

Vulih, Salomon: *See*—
Giordano, Raymond L.; and Vulih, Salomon, 4,978,868, Cl. 307-296.600.

W. L. Gore & Associates, Inc.: *See*—
Clayton, Donald L.; and Shah, Dinesh, 4,978,813, Cl. 174-117.00F.

W. R. Grace & Co.-Conn.: *See*—
Quirk, Jennifer M.; Harsy, Stephen G.; and Hakansson, Christer L., 4,978,793, Cl. 564-487.000.

W. Schlafhorst & Co.: *See*—
Kupper, Wilhelm, 4,978,081, Cl. 242-35.50R.

Waack, Richard: *See*—
Venkataswamy, Krishna; Waack, Richard; Novich, Bruce E.; and Halloran, John W., 4,978,643, Cl. 501-94.000.

Wacker-Chemie GmbH: *See*—
Haller, Ingo; Spindler, Ernst; Heisler, Manfred; and Kleine, Willi, 4,978,718, Cl. 525-239.000.

Wada, Hiroshi: *See*—
Suzuki, Tomonari; Wada, Hiroshi; Yoshimoto, Yoshikazu; Yoshida, Masaru; and Nakajima, Shigeo, 4,978,600, Cl. 429-218.000.

Wada, Keisuke; and Tsurita, Yasushi, to Mitsubishi Kasei Corporation. Porous glass and process for its production. 4,978,641, Cl. 501-39.000.

Wada, Motomu: *See*—
Mori, Sanae; Sakamoto, Masaaki; Wada, Motomu; and Ishikawa, Hideo, 4,978,587, Cl. 428-645.000.

Wada, Shigetaka: *See*—
Ukyo, Yoshio; Wada, Shigetaka; and Takatori, Kazumasa, 4,978,645, Cl. 501-98.000.

Wada, Tetsuo: *See*—
Maruta, Masamichi; and Wada, Tetsuo, 4,978,808, Cl. 568-707.000.

Wada, Yoshihiro: *See*—
Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, 4,978,740, Cl. 528-272.000.

Wagener, Heinz-Jurgen: *See*—
Pelz, Herbert; Kluting, Bernd; Wagener, Heinz-Jurgen; and Berghof, Hans-Joachim, 4,978,170, Cl. 297-411.000.

Wagenknecht, Marcel H., to Jaquet Orthopedie S.A. Transcutaneous pin for fixation of a bone part or fragment. 4,978,350, Cl. 606-72.000.

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Wagner, John C.: *See*—
Green, Alex E. S.; Green, Bruce A. S.; and Wagner, John C., 4,978,367, Cl. 44-281.000.

Wagner, W. Barry: *See*—
Madden, Thomas J.; Schlein, Barry C.; and Wagner, W. Barry, 4,977,740, Cl. 60-39.463.

Wakabayshi, Shuichi: *See*—
Tomiyama, Tsuyoshi; Tomiyama, Akira; Wakabayshi, Shuichi; Sajiki, Hironao; and Sekiguchi, Junko, 4,978,674, Cl. 514-445.000.

Wakayama, Satoshi: *See*—
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.

Wakayama, Tadaaki: *See*—
Takada, Norihisa; Kojima, Saburo; Wakayama, Tadaaki; Omi, Kyoko; Kobayashi, Nobuyuki; and Okada, Hideyuki, 4,978,549, Cl. 426-489.000.

Wakita, Naomasa; Aoki, Hideharu; and Okuda, Makoto, to NGK Spark Plug Co., Ltd. Piezoelectric actuator of lamination type. 4,978,881, Cl. 310-328.000.

Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, to Kawasaki Steel Corporation. Patterned metal plate and production thereof. 4,978,583, Cl. 428-600.000.

Walfield, Alan M.; and Pollock, Thomas J., to Snytro Corporation. Methods and compositions for expression of BTI endotoxin. 4,978,623, Cl. 435-320.000.

Walker, Hilary; and Bullwinkel, Edward P., to Kimberly-Clark Corporation. Triiodide-phosphoric acid stain and method for cellulose fiber evaluation. 4,978,364, Cl. 8-645.000.

Walker, Larry D., to North American Container, Inc. Plastic container for pressurized fluids. 4,978,015, Cl. 215-1.00C.

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Walker, Richard K.: *See*—
Hansen, Andrew H.; Walker, William C.; Walker, Richard K.; and Braly, Sam, 4,978,508, Cl. 422-186.080.

Walker, William C.: *See*—
Hansen, Andrew H.; Walker, William C.; Walker, Richard K.; and Braly, Sam, 4,978,508, Cl. 422-186.080.

Wallace Computer Services, Inc.: *See*—
Schmidt, Eric; and Popiawski, John R., 4,978,144, Cl. 283-70.000.

Wallace, Mark P., to Besser Company. Concrete block molding machine having continuously driven vibrating shaft mechanism which can be programmably vibrated and method of programmably vibrating such machines. 4,978,488, Cl. 264-72.000.

Wallace, Peter L.: *See*—
Radvan, Bronislaw; Willis, Anthony J.; and Wallace, Peter L., 4,978,489, Cl. 264-118.000.

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Liljegren, Gordon E.; and Foster, Eugene L., 4,978,216, Cl. 353-28.000.

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Walter, Claus, to Man Roland Druckmaschinen AG. Method and apparatus for coordinating a printing press control with a hard copy image. 4,977,832, Cl. 101-365.000.

Walter, Jean-Claude: *See*—
Causse, Pierre; Graham, Peter; Maury, Bernard; and Walter, Jean-Claude, 4,978,880, Cl. 310-324.000.

Walton Enterprises, Inc.: *See*—
Brock, James A., 4,977,756, Cl. 62-314.000.

Wanek, Erich: *See*—
Wilhelm, Klaus; Bauer, Johann; Schmitt, Werner; Herold, Wolf-Dietrich; Koran, Peter; Wanek, Erich; and Gasser, Oswald, 4,978,359, Cl. 623-23.000.

Wang, Pen-Chung, to Shell Oil Company. Polyamideimide polymers. 4,978,736, Cl. 528-220.000.

Ward, Carl E., to Chevron Research Company. Herbicidal 2-(substituted-phenyl)-3-amino-2-cyclopentenone derivatives. 4,978,386, Cl. 71-121.000.

Ward, John B.; Noble, Hazel M.; Porter, Neil; Fletton, Richard A.; Noble, David; Sutherland, Derek R.; and Ramsay, Michael V. J., to

American Cyanamid Company. Macrolide antibiotics and their preparation. 4,978,675, Cl. 514-450.000.

Waring, Anthony J.: *See*—
Wells, Trevor C.; and Waring, Anthony J., 4,977,985, Cl. 188-71.100.

Warpehoski, Martha A.: *See*—
Kelly, Robert C.; Warpehoski, Martha A.; and Wierenga, Wendell, 4,978,757, Cl. 548-421.000.

Warren, James W.: *See*—
Paquette, Edward L.; Riley, William C.; Taparauskas, Paul A.; and Warren, James W., 4,979,019, Cl. 357-80.000.

Warther, Richard O.; and Steen, Raymond, Jr., to Vanguard Group of Printing Companies, The. Method for making uniquely encoded transaction cards and related sheet products. 4,978,146, Cl. 283-81.000.

Washi Kosan Co., Ltd.: *See*—
Nakaya, Toshitaka; and Sumida, Kenji, 4,978,101, Cl. 251-129.150.

Washington State University Research Foundation: *See*—
Hadwiger, Lee A., 4,978,381, Cl. 71-77.000.

Wasleski, Daniel N.: *See*—
Newallis, Peter E.; Macke, Jeffrey D.; Steinbeck, Karl G.; and Wasleski, Daniel N., 4,978,795, Cl. 568-56.000.

Waste Hoists Limited: *See*—
Winwood, Hugh; and Green, Peter, 4,978,268, Cl. 414-409.000.

Watanabe, Hidehiro: *See*—
Hieda, Katsuhiko; Horiguchi, Fumio; and Watanabe, Hidehiro, 4,979,014, Cl. 357-56.000.

Watanabe, Hiroyuki: *See*—
Kurokawa, Toru; Watanabe, Hiroyuki; Tanaka, Shoichi; and Mitsui, Fumito, 4,978,552, Cl. 426-559.000.

Watanabe, Jinzo, to Mitsubishi Denki Kabushiki Kaisha. Method of making a semiconductor memory device. 4,978,635, Cl. 437-52.000.

Watanabe, Junji: *See*—
Sawada, Renshi; and Watanabe, Junji, 4,978,379, Cl. 65-18.200.

Watanabe, Katsuzi: *See*—
Nagata, Teruyuki; Tamaki, Akihiro; Watanabe, Katsuzi; and Yamaguchi, Akihiro, 4,978,792, Cl. 564-384.000.

Watanabe, Makoto: *See*—
Ashikawa, Noboru; Shimada, Kazuhiko; Tokushima, Shoji; Hamada, Tetsurou; Akama, Naoya; Takano, Masami; and Watanabe, Makoto, 4,977,989, Cl. 192-56.00R.

Watanabe, Takayuki: *See*—
Ezawa, Hiroshi; Nakakura, Toshiyuki; Watanabe, Takayuki; and Tsushima, Hiroaki, 4,978,692, Cl. 521-185.000.
Isshiki, Tomiya; Kijima, Yasuhiko; Ito, Akiro; Miyauchi, Yuh; Konko, Takao; and Watanabe, Takayuki, 4,978,778, Cl. 560-261.000.

Watanabe, Yoshiaki: *See*—
Tanaka, Sakae; Watanabe, Yoshiaki; Shirai, Katsuo; and Ogiwara, Yoshihisa, 4,979,006, Cl. 357-23.700.

Weaver, Lindsay A., Jr.: *See*—
Gilhousen, Klein S.; Jacobs, Irwin M.; and Weaver, Lindsay A., Jr., 4,979,170, Cl. 370-104.100.

Webasto AG Fahrzeugtechnik: *See*—
Schreiter, Thomas; Fuerst, Arpad; and Wingen, Bernhard, 4,978,165, Cl. 296-216.000.

Weber, Engelbert: *See*—
Schmidt-Hellerau, Christof; Weber, Engelbert; and Matthias, Guenther, 4,978,711, Cl. 524-841.000.

Weber, Frank: *See*—
Selbeck, Harald; Horsthemke, August; Bockmann, August; and Weber, Frank, 4,978,743, Cl. 528-499.000.

Weber, Heinz: *See*—
Frey, Otto; Semlitsch, Manfred; and Weber, Heinz, 4,978,355, Cl. 623-16.000.

Weber, Joerg. Method for producing a third image that clarifies the differences between two images which are allocated to one another. 4,979,222, Cl. 382-6.000.

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Weber S.r.l.: *See*—
Bonfiglioli, Silverio; and Fato, Massimo, 4,977,880, Cl. 123-488.000.

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Dole, Charles M.; Webster, Gary L.; and Smith, Ward C., 4,978,502, Cl. 422-58.000.

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Sun, Jim C.; Boone, Mark B.; Dunbar, James J.; and Weedon, Gene C., 4,978,492, Cl. 264-180.000.

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Schmeling, Edith L.; Roschenbleck, Benno; and Weidemann, Michael H., 4,978,432, Cl. 204-58.400.

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Toye, Frederic J.; and Weinstein, James D., 4,978,334, Cl. 604-51.000.

Weis, Paul D.: *See*—
Bond, David G.; Hill, Todd; Weis, Paul D.; and Woods, John R., 4,979,191, Cl. 375-108.000.

Weitekamp, Maurice E., to Weimer Bearing & Transmission, Inc. Rotor indexing system. 4,978,080, Cl. 241-101.200.

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Dohler, Hardi; Jachmann, Jurgen; Weitemeyer, Christian; and Wewers, Dietmar, 4,978,726, Cl. 525-479.000.

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Dombrowski, Mitchell P.; and Welch, Robert A., 4,978,344, Cl. 604-198.000.

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Reim, Wolfgang; and Weller, Dieter, 4,978,584, Cl. 428-611.000.

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Wells, Trevor C.; and Waring, Anthony J., to Dunlop Limited a British Company. Method of carrying out maintenace of multi-disc brake arrangement. 4,977,985, Cl. 188-71.100.

Welschoff, Heinz. Automobile sun shield. 4,978,160, Cl. 296-97.800.

Wennekers, Peter, to Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung E.V. Field effect transistor and process for the production of a field effect transistor. 4,979,003, Cl. 357-22.000.

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Pontow, Bernd; Wenning, Hans-Peter; Grimminger, Albert; and Strecker, Jurgen, 4,978,369, Cl. 48-197.00R.

Wentworth, Robert J.: *See*—
Belanger, James A.; Wentworth, Robert J.; and Astley, Graham J., 4,977,689, Cl. 34-243.00C.

Werlein, Eugen R.: *See*—
Peiffer, Dennis G.; Lundberg, Robert D.; Newlove, John C.; and Werlein, Eugen R., 4,978,461, Cl. 252-8.511.

Werzalit AG & Co.: *See*—
Munk, Edmund; and Huber, Helmuth, 4,977,930, Cl. 138-89.000.

Werzeugmaschinenfabrik Oerlikon-Buhrle AG: *See*—
Engel, Walter; Moser, Franz; and Sigrist, Hugo, 4,977,657, Cl. 29-1.210.

West Company Incorporated, The: *See*—
Bayan, Ghawamedin; and Esposito, Anthony S., 4,978,714, Cl. 525-69.000.

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Westland, William F.; and Tindell, James M., to Lex Computer and Management Corporation. Video composition method for assembling video segments. 4,979,050, Cl. 360-14.100.

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Weber, Karl-Arnold; Henk, Hermann; Kunde, Klaus; Westphal, Jochen; and Wunderlich, Klaus, 4,978,747, Cl. 534-735.000.

Westvaco Corporation: *See*—
Lowry, Frank P., 4,978,426, Cl. 162-65.000.

Wet Designs: *See*—
Fuller, Mark W.; and Robinson, Alan S., 4,978,066, Cl. 239-12.000.

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Dohler, Hardi; Jachmann, Jurgen; Weitemeyer, Christian; and Wewers, Dietmar, 4,978,726, Cl. 525-479.000.

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Luijtjes, Nicolaas G.; Galanakis, Claire T.; and Whalen, Barry H., 4,978,835, Cl. 219-121.640.

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Kelly, Robert C.; Warpehoski, Martha A.; and Wierenga, Wendell, 4,978,757, Cl. 548-421.000.

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Radvan, Bronislaw; Willis, Anthony J.; and Wallace, Peter L., 4,978,489, Cl. 264-118.000.

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Malcolm, David H.; and Wilenius, George P. T., 4,979,198, Cl. 378-102.000.

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Wilhelm, Klaus; Bauer, Johann; Schmitt, Werner; Herold, Wolf-Dietrich; Koran, Peter; Wanek, Erich; and Gasser, Oswald, to Thera Patent GmbH & Co. KG Gesellschaft fur industrielle Schutzrechte. Prosthesis shaft. 4,978,359, Cl. 623-23.000.

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Lembke, Max, 4,978,031, Cl. 221-102.000.

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Hagmann, Paul; and Hardt, Manfred, 4,978,046, Cl. 227-4.000.

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Song, Joo H., 4,978,537, Cl. 426-5.000.

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Williams, Fred C., deceased; and Williams, Dorothy, executor, 4,978,961, Cl. 342-25.000.

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Malsheen, Bathsheba J.; Groner, Gabriel F.; and Williams, Linda D., 4,979,216, Cl. 381-52.000.

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Crow, William D.; and Williams, Ronald D., 4,978,819, Cl. 200-80.00R.

Willis, Anthony J.: *See*—
Radvan, Bronislaw; Willis, Anthony J.; and Wallace, Peter L., 4,978,489, Cl. 264-118.000.

Willoughby, Ross C.; and Buchner, James D., to Extrel Corporation. Method and apparatus for introduction of fluid streams into mass spectrometers and other gas phase detectors. 4,977,785, Cl. 73-863.120.

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Bassous, Ernest; Blum, Joseph M.; Chan, Kevin K.; Lamberti, Angela C.; Lapadula, Constantino; Lovas, Istvan; and Wilson, Alan D., 4,978,421, Cl. 156-645.000.

Wilson, P. Henry; and Kelso, William A. Pivotable hand truck apparatus. 4,978,132, Cl. 280-47.131.

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Schreiter, Thomas; Fuerst, Arpad; and Wingen, Bernhard, 4,978,165, Cl. 296-216.000.

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Rothfuss, Hans; Bruckner, Raimund; Keutgen, Peter; Seeger, Josef; Winkelmann, Manfred; and Metzger, Herbert, 4,978,108, Cl. 266-220.000.

Winkler, Ekhard: *See*—
Baur, Richard; Birnbach, Stefan; Oftring, Alfred; and Winkler, Ekhard, 4,978,805, Cl. 568-622.000.

Winwood, Hugh; and Green, Peter, to Waste Hoists Limited. Collection vehicle, hoist for the vehicle and method of tipping a bin. 4,978,268, Cl. 414-409.000.

Wirz, Peter, to Leybold Aktiengesellschaft. Method of applying optical coatings of silicon compounds by cathode sputtering, and a sputtering cathode for the practice of the method. 4,978,437, Cl. 204-192.230.

Wisnik, Howard: *See*—
Pruden, Benny J.; Wisnik, Howard; and Hudis, Scott, 4,979,208, Cl. 379-145.000.

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Bissinger, Fridolin; Krzyzanowski, Erich; and Wittmoser, Adalbert, 4,977,945, Cl. 164-235.000.

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Gillner, Manfred; Wlaschitsch, Josef; and Nuding, Werner, deceased, 4,978,207, Cl. 350-631.000.

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Wolcott, Frederick C.: *See*—
Laine, Donald D.; Rochte, Jerry E.; and Wolcott, Frederick C., 4,979,093, Cl. 364-167.010.

Wolfe, Raymond: *See*—
Blonder, Greg E.; Henry, Charles H.; Kazarinov, Rudolf F.; and Wolfe, Raymond, 4,978,189, Cl. 350-96.120.

Wolff Walsrode AG: *See*—
Wilke, Michaela; Szablikowski, Klaus; and Balser, Klaus, 4,978,750, Cl. 536-114.000.

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Reske, Eckart; and Wolters, Ernst, 4,978,725, Cl. 525-399.000.

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Wong, Peter Y. S.: *See*—
Shannon, Michael V.; and Wong, Peter Y. S., 4,978,169, Cl. 297-410.000.

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Manns, William G.; Wood, Anthony B.; and Norwood, David A., 4,979,223, Cl. 382-8.000.

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Wood, Thomas H. Carrier bearing and axle bearing puller. 4,977,661, Cl. 29-261.000.

Woodhams, Raymond T., to University of Toronto Innovations Foundation, The. Bitumen-polyolefin compositions. 4,978,698, Cl. 524-62.000.

Woodle, Boyd M.: *See*—
Granata, Samuel J., Jr.; and Woodle, Boyd M., 4,978,590, Cl. 429-35.000.

Woods, John R.: *See*—
Bond, David G.; Hill, Todd; Weis, Paul D.; and Woods, John R., 4,979,191, Cl. 375-108.000.

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Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., 4,978,647, Cl. 502-7.000.

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Knight, Larry F.; Ogilvie, Daniel K.; and Worsham, Ronny W., 4,977,921, Cl. 137-266.000.

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Hsu, Tsung-Yuan; Wu, Shin-Tson; and Loo, Robert Y., 4,978,208, Cl. 351-45.000.

Wunderlich, Klaus: *See*—
Weber, Karl-Arnold; Henk, Hermann; Kunde, Klaus; Westphal, Jochen; and Wunderlich, Klaus, 4,978,747, Cl. 534-735.000.

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Xerox Corporation: *See*—
Appel, James J., 4,978,185, Cl. 350-6.800.
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Frankel, Neil A.; Lindblad, Nero R.; Relyea, Herbert C.; and Meyer, Robert J., 4,978,999, Cl. 355-299.000.

Yagi, Nobuyuki; Inagaki, Jiroh; Morita, Kozo; Kaku, Yasutoshi; Kikuchi, Nobuyuki; and Mizuno, Shinji, to Teikoku Tsushin Kogyo Co., Ltd. Molded resin casing of electronic part incorporating flexible board. 4,978,491, Cl. 264-154.000.

Yagi, Tetsuo: *See*—
Isozumi, Shuzoo; Yagi, Tetsuo; and Tanaka, Toshinori, 4,978,874, Cl. 310-83.000.

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Yagihara, Morio: *See*—
Inoue, Nobuaki; Yagihara, Morio; and Takagi, Yoshihiro, 4,978,603, Cl. 430-265.000.

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Yakurigaku Chuo Kenkyusho: *See*—
Takahashi, Hidehiko, 4,978,536, Cl. 424-684.000.

Yakuwa, Masahiko: *See*—
Takano, Osamu; Kawakami, Hiroshi; and Yakuwa, Masahiko, 4,979,143, Cl. 364-900.000.

Yale University: *See*—
Lin, Tai-Shun; and Prusoff, William H., 4,978,655, Cl. 514-50.000.

Yamada, Hiroyuki: *See—*
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.

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Adachi, Masaharu; Uematsu, Yoshiaki; Nagano, Haruo; and Yamada, Koji, 4,977,994, Cl. 194-210.000.

Yamada, Kunihiro: *See—*
Ito, Yasunobu; Yamada, Kunihiro; and Kubota, Akihiko, 4,979,072, Cl. 361-87.000.

Yamada, Mitsuo: *See—*
Takagawa, Ryozo; Tanabe, Hisaki; Asakura, Koji; Yamada, Mitsuo; Ohsugi, Hiroharu; Mizuguchi, Ryuzo; and Eguchi, Yoshio, 4,978,777, Cl. 560-224.000.

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Yamada, Shigeto: *See—*
Iwama, Shinichi; Tsugami, Keiji; and Yamada, Shigeto, 4,977,692, Cl. 36-119.000.

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Yamada, Yoshiko, to Yamada, Yoshiko. Multiplexing apparatus. 4,979,166, Cl. 370-84.000.

Yamada, Youichi; and Takahashi, Keiko, to OKI Electric Industry Co., Ltd. Speech recognition system in which voiced intervals are broken into segments that may have unequal durations. 4,979,212, Cl. 381-45.000.

Yamada, Yukio: *See—*
Ohmori, Naoto; Matsuura, Yasuhiro; Hasegawa, Hirofumi; Kojima, Hiroaki; and Yamada, Yukio, 4,978,977, Cl. 346-108.000.

Yamagishi, Katsuaki; Kashima, Koji; Mitani, Akio; and Shimura, Masatoshi, to Kabushiki Kaisha Toshiba. Latent heat regenerating apparatus. 4,977,953, Cl. 165-10.000.

Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, to Eisai Co., Ltd. Diphenylethylene derivative and pharmaceutical use. 4,978,767, Cl. 558-402.000.

Yamaguchi, Akihiro: *See—*
Nagata, Teruyuki; Tamaki, Akihiro; Watanabe, Katsuzi; and Yamaguchi, Akihiro, 4,978,792, Cl. 564-384.000.

Yamaguchi, Junko: *See—*
Taniguchi, Keishi; and Yamaguchi, Junko, 4,978,709, Cl. 524-606.000.

Yamaguchi, Takuji: *See—*
Kurono, Masayasu; Kondo, Yasuaki; Yamaguchi, Takuji; Miura, Kenji; Usui, Toshinao; Terada, Naofumi; Asano, Kyoichi; Mizuno, Kuniharu; Matsubara, Akira; Kato, Noriaki; Sawai, Kiichi; Unno, Ryoichi; Ozawa, Hiroshi; and Fukushima, Masato, 4,978,758, Cl. 548-309.000.

Yamaguchi, Toru: *See—*
Aoki, Hisao; and Yamaguchi, Toru, 4,977,956, Cl. 165-176.000.

Yamaguchi, Toshiharu: *See—*
Yamazaki, Shunpei; Inujima, Takashi; Hamatani, Toshiji; Konuma, Toshimitsu; Sakama, Mitsunori; Kobayashi, Ippei; and Yamaguchi, Toshiharu, 4,978,203, Cl. 350-339.00R.

Yamaguchi, Yuichi: *See—*
Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,978,898, Cl. 318-280.000.

Yamaha Corporation: *See—*
Norimatsu, Takashi, 4,977,813, Cl. 84-722.000.
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; Masubuchi, Takamichi; and Sakama, Masao, 4,977,811, Cl. 84-600.000.

Yamaichi Denki Kogyo Kabushiki Kaisha: *See—*
Akimoto, Mitsuru; Jimbo, Takamasa; Umemura, Kiyoshi; Iwase, Haruhiko; and Ogawa, Kenzirou, 4,978,914, Cl. 324-158.00F.

Yamakawa, Masami, to Aisens Co., Ltd. Photoelectric sensor having a folded light path. 4,978,843, Cl. 250-216.000.

Yamamoto, Masao: *See—*
Nohira, Hiroyuki; Masaki, Mitsuo; and Yamamoto, Masao, 4,978,666, Cl. 514-255.000.

Yamamoto, Shigeru: *See—*
Nakagawa, Kanji; Asakura, Yoshio; Yamamoto, Shigeru; Ninomiya, Kohei; and Kinouchi, Masayuki, 4,978,430, Cl. 203-014.000.

Yamamoto, Yuzo: *See—*
Kodama, Kenji; and Yamamoto, Yuzo, 4,978,399, Cl. 148-250.000.

Yamamura, Masaaki: *See—*
Aoyagi, Muneo; Takanashi, Kazuhiro; Yamamura, Masaaki; Murata, Moriyasu; Yamada, Hiroyuki; Araki, Hiroyuki; and Fukumoto, Takanori, 4,978,770, Cl. 558-455.000.

Yamano, Mitsuhisa: *See—*
Maeda, Yoshiharu; Mizuno, Yukio; Nakatani, Akira; and Yamano, Mitsuhisa, 4,978,752, Cl. 540-222.000.

Yamasaki, Masafumi; Toyofuku, Toshiyuki; Itoh, Junichi; and Kodama, Shinichi, to Olympus Optical Co., Ltd. Exposure control apparatus for camera. 4,978,990, Cl. 354-432.000.

Yamashita, Akihiko: *See—*
Mizutani, Yosuke; Asano, Takehiko; Yanase, Syuji; Kitagawa, Shinichiro; and Yamashita, Akihiko, 4,979,037, Cl. 358-133.000.

Yamashita, Masayoshi: *See—*
Nishihira, Keigo; Fujikawa, Shuzo; and Yamashita, Masayoshi, 4,978,766, Cl. 558-353.000.

Yamashita, Saburo: *See—*
Miyahara, Shuji; Kimuro, Harumi; and Yamashita, Saburo, 4,977,910, Cl. 134-7.000.

Yamashita, Shinji: *See—*
Uehara, Masao; Sasagawa, Katsuyoshi; Yamashita, Shinji; Sasaki, Masahiko; Saito, Katsuyuki; Kanoo, Masahide; Uchikubo, Akinobu; Nakagawa, Takehiro; and Hasegawa, Jun, 4,979,035, Cl. 358-98.000.

Yamatsu, Isao: *See—*
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Yamazaki, Keiko; and Kawaji, Toshikuni, to Fordonal, S.A. Clebopride transdermal patch. 4,978,531, Cl. 424-448.000.

Yamazaki Mazak Corporation: *See—*
Inoue, Toshihiko; Uemura, Kazuki; Oshima, Katsushi; Ohashi, Hajime; and Sano, Yuji, 4,979,121, Cl. 364-474.360.

Yamazaki, Shunpei; Inujima, Takashi; Hamatani, Toshiji; Konuma, Toshimitsu; Sakama, Mitsunori; Kobayashi, Ippei; and Yamaguchi, Toshiharu, to Semiconductor Energy Laboratory Co., Ltd. Liquid crystal device with an apparent hysteresis. 4,978,203, Cl. 350-339.00R.

Yamazaki, Toshiaki: *See—*
Kawamoto, Hitoshi; Ozawa, Yoshimichi; Naito, Hiroshi; Wada, Yoshihiro; Yamazaki, Toshiaki; and Harada, Ichiya, 4,978,740, Cl. 528-272.000.

Yamin, Michael A.: *See—*
Cerami, Anthony; and Yamin, Michael A., 4,978,684, Cl. 514-632.000.

Yanagida, Takahiro: *See—*
Takahashi, Yutaka; Noguchi, Yoshihiro; Yanagida, Takahiro; and Imai, Tomohisa, 4,977,639, Cl. 15-319.000.

Yanagihara, Takeshi: *See—*
Hoshino, Futoshi; Nakano, Makoto; and Yanagihara, Takeshi, 4,978,695, Cl. 523-201.000.

Yanagishima, Fumiya: *See—*
Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.

Yanase, Syuji: *See—*
Mizutani, Yosuke; Asano, Takehiko; Yanase, Syuji; Kitagawa, Shinichiro; and Yamashita, Akihiko, 4,979,037, Cl. 358-133.000.

Yang, Keun Y., to Goldstar Co., Ltd. Laser scanning system for displaying a three-dimensional color image. 4,978,202, Cl. 350-331.00R.

Yang, Keun Y., to Goldstar Co., Ltd. Apparatus for determining concentrations of mineral elements. 4,979,123, Cl. 364-498.000.

Yashiro, Masaaki: *See—*
Shen, Bing-Whey; Yashiro, Masaaki; McKee, Randy; Chung, Gishi; Shirai, Kiyoshi; Teng, Clarence; and Coleman, Donald J., Jr., 4,978,634, Cl. 437-52.000.

Yasnogorodsky, Vadim L.: *See—*
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Yasue, Yoshihiko: *See—*
Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, 4,978,588, Cl. 204-192.310.

Yasui, Shinichi: *See—*
Sekimoto, Isao; and Yasui, Shinichi, 4,977,667, Cl. 29-784.000.

Yasui, Yasuyoshi; and Iguchi, Norihisa, to Toyota Jidosha Kabushiki Kaisha. Limited slip differential. 4,978,329, Cl. 475-84.000.

Yasumi, Tadaaki: *See—*
Wakui, Tsuneyoshi; Ohnishi, Takeo; Shimoyama, Yuji; Kuguminato, Hideo; Kosumi, Fumio; Yasumi, Tadaaki; Ohno, Hironobu; Akizuki, Toshio; and Yanagishima, Fumiya, 4,978,583, Cl. 428-600.000.

Yasutomi, Sucharu; and Taniguchi, Morimasa. Clamping tool for stud bolt. 4,977,799, Cl. 81-53.200.

Yates, John B., III: *See—*
Brown, Sterling B.; McFay, Dennis J.; Yates, John B., III; and Lee, Gim F., 4,978,715, Cl. 525-92.000.

Yazaki Corporation: *See—*
Kameyama, Isao; and Yoshizawa, Masaaki, 4,978,313, Cl. 439-248.000.
Maejima, Toshiro, 4,978,314, Cl. 439-398.000.
Suzuki, Yoshiyuki; and Aoki, Kunimitsu, 4,978,196, Cl. 350-174.000.

Yianni, Paul A.: *See—*
Cray, Stephen E.; McVie, James; and Yianni, Paul A., 4,978,561, Cl. 427-387.000.

Yin, Khin S.; Virgadamo, Michael J.; Tanaka, David D.; and Banuelos, Angel F., to Hughes Aircraft Company. Hologram transfer process. 4,978,593, Cl. 430-2.000.

Yoda, Yoshiro, to Olympus Optical Co., Ltd. Bias magnetic field abnormality detecting apparatus which controls recording and erasing of information. 4,979,158, Cl. 369-013.000.

Yokoi, Takeshi, to Brother Kogyo Kabushiki Kaisha. Sheet feeder for printer. 4,978,112, Cl. 271-9.000.

Yokosuka, Michio: *See*—
Suzuki, Akira; Ito, Susumu; Okamoto, Kikuhiko; Hoshino, Eiichi; Yokosuka, Michio; and Murata, Moriyasu, 4,978,470, Cl. 252-174.120.

Yokota, Hiroshi: *See*—
Ito, Masumi; Yokota, Hiroshi; Danzuka, Toshio; and Takagi, Masahiro, 4,978,378, Cl. 65-3.120.

Yokoyama, Ichiro: *See*—
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.

Yokoyama, Sadayuki; Asano, Masamichi; Iwahashi, Hiroshi; and Nakagawa, Kaoru, to Kabushiki Kaisha Toshiba. Electrically erasable non-volatile semiconductor device. 4,979,146, Cl. 365-185.000.

Yomura, Yoshinori: *See*—
Adaniya, Takeshi; Yomura, Yoshinori; Ooniwa, Naoyuki; Yasue, Yoshihiko; Kagechika, Hiroshi; Mishima, Tadahiko; and Ishikawa, Hiroshi, 4,978,588, Cl. 204-192.310.

Yoneda, Shigeru: *See*—
Tanaka, Kazuaki; Yokoyama, Ichiro; Wakayama, Satoshi; Kamegi, Yoshito; Urakawa, Makoto; Tokunaga, Mikihiko; Kamoshida, Takeshi; Yoneda, Shigeru; and Kiyasu, Kiyotaka, 4,979,109, Cl. 364-200.000.

Yoshida Kogyo K. K.: *See*—
Ida, Kazuo, 4,977,650, Cl. 24-614.000.
Niwata, Sotoharu, 4,977,717, Cl. 52-235.000.

Yoshida, Masaru: *See*—
Suzuki, Tomonari; Wada, Hiroshi; Yoshimoto, Yoshikazu; Yoshida, Masaru; and Nakajima, Shigeo, 4,978,600, Cl. 429-218.000.

Yoshida, Noriyuki: *See*—
Takahashi, Kenichi; and Yoshida, Noriyuki, 4,978,376, Cl. 65-3.110.

Yoshida, Osamu: *See*—
Yamada, Koichi; Enomoto, Hiroshi; and Yoshida, Osamu, 4,977,737, Cl. 57-97.000.

Yoshihara, Tetsuya: *See*—
Inubushi, Hisao; Yoshihara, Tetsuya; and Sakamoto, Mioshi, 4,978,040, Cl. 222-598.000.

Yoshihiro, Yoshiro; Adachi, Masahiro; and Imai, Minoru, to Nippon Welding Rod Company, Ltd. Method for removing binder from green body. 4,978,498, Cl. 419-37.000.

Yoshimoto, Yoshikazu: *See*—
Suzuki, Tomonari; Wada, Hiroshi; Yoshimoto, Yoshikazu; Yoshida, Masaru; and Nakajima, Shigeo, 4,978,600, Cl. 429-218.000.

Yoshimura, Hiroyuki: *See*—
Yamagishi, Youji; Akasaka, Kozo; Suzuki, Takeshi; Miyamoto, Mitsuaki; Nakamoto, Kouji; Okano, Kazuo; Abe, Shinya; Ikuta, Hironori; Hayashi, Kenji; Yoshimura, Hiroyuki; Fujimori, Tohru; Harada, Koukichi; and Yamatsu, Isao, 4,978,767, Cl. 558-402.000.

Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, to Toa Nenryo Kogyo, K. K. Traction fluid. 4,978,468, Cl. 252-79.000.

Yoshimura, Toshiteru: *See*—
Tomita, Norihiro; Yoshimura, Toshiteru; Kotoh, Masayuki; Ono, Masayosi; Kobayashi, Takayuki; and Monden, Katsunori, 4,978,136, Cl. 280-751.000.

Yoshioka, Masanobu: *See*—
Hikone, Makoto; Maeda, Kouzo; and Yoshioka, Masanobu, 4,978,138, Cl. 280-777.000.

Yoshizawa, Masaaki: *See*—
Kameyama, Isao; and Yoshizawa, Masaaki, 4,978,313, Cl. 439-248.000.

Youmans, Arthur H., to Western Atlas International Inc. Method and apparatus for measuring subsurface characteristics using pulsed neutron/gamma ray logging. 4,978,851, Cl. 250-270.000.

Young, Donald C., to Union Oil Company of California. Methods for selectively recovering vanadium from phosphoric acid and vanadium sources. 4,978,511, Cl. 423-65.000.

Young, Douglas F.: *See*—
Bieniarz, Christopher; Cornwell, Michael J.; and Young, Douglas F., 4,978,613, Cl. 435-18.000.

Young, Eddie H. C.; and Jacob, James J., to Spectra-Physics; and Newport Electro Optic Systems. Acousto-optical device with lithium tantalate transducer. 4,979,176, Cl. 372-13.000.

Young, Harold R.: *See*—
Furrow, Roger W.; and Young, Harold R., 4,978,029, Cl. 222-1.000.

Yu, Chyang J.: *See*—
Bardhan, Pronob; Bartholomew, Roger F.; Trotter, Donald M., Jr.; and Yu, Chyang J., 4,978,646, Cl. 501-134.000.

Yudate, Toshihiro: *See*—
Sugioka, Takami; Ueno, Toshiyuki; Yudate, Toshihiro; and Kobayashi, Koji, 4,978,082, Cl. 242-46.400.

Yusa, Seiichi: *See*—
Takigawa, Shogo; Yusa, Seiichi; and Futagi, Eiji, 4,977,997, Cl. 198-374.000.

Yuyama, Masahiro; Moritani, Masahiko; and Futagami, Mikio, to Sumitomo Chemical Company, Limited. Coating composition. 4,978,702, Cl. 524-266.000.

Yuzuriha, Naoki: *See*—
Futami, Tohru; and Yuzuriha, Naoki, 4,978,137, Cl. 280-775.000.

Yves, Samuel; and Cauvy, Daniel, to Norsolor. Process for the manufacture of methyl methacrylate from isobutyric acid. 4,978,776, Cl. 560-214.000.

Zagoruiko, Andrei N.: *See*—
Matros, Jury S.; Zagoruiko, Andrei N.; Malakhova, Irina V.; and Eremin, Oleg G., 4,978,519, Cl. 423-574.00R.

Zaretsky, Efim I.: *See*—
Sirotenko, Vadim A.; Degtyareva, Eleonora V.; Grinberg, Yakov M.; Zaretsky, Efim I.; Yasnogorodsky, Vadim L.; Khanin, Andrei M.; Kantemir, Anatoly D.; Tuz, Vladimir N.; Serezhkina, Lidia P.; Moscow; and Gnilitskaya, Alla I., 4,978,466, Cl. 252-49.300.

Zeitvogel, Heinrich, to Telefunken electronic GmbH. Settable resistor. 4,978,939, Cl. 338-176.000.

Zeller, John: *See*—
Newman, Alec T.; and Zeller, John, 4,978,024, Cl. 220-90.400.

Zeppelin-Metallwerke GmbH: *See*—
Wilms, Harald, 4,978,228, Cl. 366-138.000.

Zerod, Richard D.; and Hamel, Gregory R., to Ford Motor Company. Audio limiter using voltage multiplexed feedback. 4,978,926, Cl. 330-279.000.

Ziess, Karl R. Method for the production and processing of reactant mixtures of plastics. 4,978,575, Cl. 428-402.000.

Zikes, Bradley C.: *See*—
Donnelly, Donald E.; Zikes, Bradley C.; Moore, Dwain F.; Price, Jeffrey E.; and Toth, Bartholomew L., 4,978,292, Cl. 431-75.000.

Zimmer Inc.: *See*—
Bobyn, John D., 4,978,358, Cl. 623-23.000.
Devanathan, Thirumalai N. C., 4,978,360, Cl. 623-66.000.

Zortech International Limited: *See*—
Hughes, John T., 4,978,229, Cl. 374-30.000.

Zsifkovits, Johann: *See*—
Nebelung, Hermann H.; and Zsifkovits, Johann, 4,978,380, Cl. 65-260.000.

Zveibil, Salvador M. Convertible and reversible solar shed or ceiling. 4,977,713, Cl. 52-65.000.

Zymark Corporation: *See*—
Buote, William J., 4,978,846, Cl. 250-231.130.

775 Corporation: *See*—
Embry, Donald, 4,977,768, Cl. 70-491.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF DECEMBER, 1990

NOTE—Arranged in accordance with the first significant character or word of the name
(in accordance with city and telephone directory practice).

Automatik Apparate-Maschinenbau GmbH: See—
Hunke, Friedrich, Re. 33,492, Cl. 210-173.000.

Bisseling, Wilhelmus T. L., to Oce-Nederland B.V. Electronic digitized *proportional-integral controller. Re. 33,500, Cl. 388-809.000.*

BOC, Inc.: *See—*
Kudzma, Linas V.; Spencer, H. Kenneth; and Savernak, Sherry A., Re. 33,495, Cl. 546-209.000.

Cox, Larry B.: *See—*
Johnson, William C.; Marpoe, Ronald W.; and Cox, Larry B., Re. 33,491, Cl. 141-114.000.

General Motors Corporation: *See—*
Lee, Peter S.; Majkowski, Richard F.; and Partin, Dale L., Re. 33,493, Cl. 250-343.000.

Hindmarsh, Leslie W.; Knight, Robert G.; and Sanders, Gerald J., to Santrade Ltd. Pick holding arrangements. Re. 33,494, Cl. 299-91.000.

Hitachi, Ltd.: *See—*
Matsuno, Jyunichi; Kawauchi, Masataka; Yoshida, Masashi; and Kawamura, Satoshi, Re. 33,496, Cl. 346-76.0PH.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Nakano, Yoshikatsu; and Matsuura, Masaaki, Re. 33,499, Cl. 123-198.00F.

Honma, Hideo; and Sato, Nobuyuki, to Sony Corporation. Portable tape player with radio in lid. Re. 33,497, Cl. 369-10.000.

Hunke, Friedrich, to Automatik Apparate-Maschinenbau GmbH. Apparatus for cooling and granulation of thermoplastic strands. Re. 33,492, Cl. 210-173.000.

Intuit: *See—*
Proulx, Thomas A.; and LeFevre, Thomas H. A., Re. 33,498, Cl. 400-630.000.

Johnson, William C.; Marpoe, Ronald W.; and Cox, Larry B., to Rand Farm Systems Inc.; and Poly Farms, Inc. Agricultural bag loading machine. Re. 33,491, Cl. 141-114.000.

Kawamura, Satoshi: See—
Matsuno, Jyunichi; Kawauchi, Masataka; Yoshida, Masashi; and Kawamura, Satoshi, Re. 33,496, Cl. 346-76.0PH.

Kawauchi, Masataka: See—
Matsuno, Jyunichi; Kawauchi, Masataka; Yoshida, Masashi; and Kawamura, Satoshi, Re. 33,496, Cl. 346-76.0PH.

Knight, Robert G.: See—
Hindmarsh, Leslie W.; Knight, Robert G.; and Sanders, Gerald J., Re. 33,494, Cl. 299-91.000.

Kudzma, Linas V.; Spencer, H. Kenneth; and Savernak, Sherry A., to BOC, Inc. Stereoselective preparation of 3-substituted-4-anilinopiperidine compounds and derivatives. Re. 33,495, Cl. 546-209.000.

Lee, Peter S.; Majkowski, Richard F.; and Partin, Dale L., to General Motors Corporation. Method and apparatus for measuring stable isotopes. Re. 33,493, Cl. 250-343.000.

LeFevre, Thomas H. A.: *See—*
Proulx, Thomas A.; and LeFevre, Thomas H. A., Re. 33,498, Cl. 400-630.000.

Majkowski, Richard F.: See—
Lee, Peter S.; Majkowski, Richard F.; and Partin, Dale L., Re. 33,493, Cl. 250-343.000.

Marpoe, Ronald W.: *See—*
Johnson, William C.; Marpoe, Ronald W.; and Cox, Larry B., Re. 33,491, Cl. 141-114.000.

Matsuno, Jyunichi; Kawauchi, Masataka; Yoshida, Masashi; and *Kawamura, Satoshi, to Hitachi, Ltd. Thermal transfer recording* apparatus. Re. 33,496, Cl. 346-76.0PH.

Matsuura, Masaaki: *See—*
Nakano, Yoshikatsu; and Matsuura, Masaaki, Re. 33,499, Cl. 123-198.00F.

Nakano, Yoshikatsu; and Matsuura, Masaaki, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for the control of valve operations in internal combustion engine. Re. 33,499, Cl. 123-198.00F.

Oce-Nederland B.V.: *See—*
Bisseling, Wilhelmus T. L., Re. 33,500, Cl. 388-809.000.

Partin, Dale L.: *See—*
Lee, Peter S.; Majkowski, Richard F.; and Partin, Dale L., *Re. 33,493, Cl. 250-343.000.*

Poly Farms, Inc.: *See—*
Johnson, William C.; Marpoe, Ronald W.; and Cox, Larry B., *Re. 33,491, Cl. 141-114.000.*

Proulx, Thomas A.; and LeFevre, Thomas H. A., to Intuit. Method and structure for properly aligning forms in a printer. Re. 33,498, Cl. 400-630.000.

Rand Farm Systems Inc.: *See—*
Johnson, William C.; Marpoe, Ronald W.; and Cox, Larry B., Re. 33,491, Cl. 141-114.000.

Sanders, Gerald J.: *See—*
Hindmarsh, Leslie W.; Knight, Robert G.; and Sanders, Gerald J., Re. 33,494, Cl. 299-91.000.

Santrade Ltd.: *See—*
Hindmarsh, Leslie W.; Knight, Robert G.; and Sanders, Gerald J., Re. 33,494, Cl. 299-91.000.

Sato, Nobuyuki: *See—*
Honma, Hideo; and Sato, Nobuyuki, Re. 33,497, Cl. 369-10.000.

Savernak, Sherry A.: *See—*
Kudzma, Linas V.; Spencer, H. Kenneth; and Savernak, Sherry A., Re. 33,495, Cl. 546-209.000.

Sony Corporation: *See—*
Honma, Hideo; and Sato, Nobuyuki, Re. 33,497, Cl. 369-10.000.

Spencer, H. Kenneth: *See—*
Kudzma, Linas V.; Spencer, H. Kenneth; and Savernak, Sherry A., Re. 33,495, Cl. 546-209.000.

Steinbock, Rolf H. Apparatus to mechanically stress a bolt-type fastener. Re. 33,490, Cl. 29-116.200.

Yoshida, Masashi: *See—*
Matsuno, Jyunichi; Kawauchi, Masataka; Yoshida, Masashi; and Kawamura, Satoshi, Re. 33,496, Cl. 346-76.0PH.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Mapes, Carl R.: *See—*
Sauer, Gale E.; and Mapes, Carl R., B1 3,921,346, Cl. 52-30.000.

Sauer, Gale E.; and Mapes, Carl R. Fire retardant shaft wall. B1 3,921,346, 12-18-90, Cl. 52-30.000.

LIST OF DESIGN PATENTEES

Advanced Digital Information Corporation: See—
Searle, Nathan H.; Brown, Jeffrey C.; and Kaneko, Steve, 313,011, Cl. D14-100.000.

Aguilar, Tito M., Jr. Lunette trailer hitch anti-theft device. 312,958, 12-18-90, Cl. D8-346.000.

Alaron, Inc.: *See—*
Ehrmann, Alexander, 313,021, Cl. D14-196.000.

Alexander, David A.: See—
Alexander, Jimmy E.; and Alexander, David A., 313,060, Cl. D22-134.000.

Alexander, Jimmy E.; and Alexander, David A. Night fishing alarm. 313,060, 12-18-90, Cl. D22-134.000.

Aloka Co., Ltd.: See—
Kijima, Masaichi; and Yajima, Nobumichi, 313,074, Cl. D24-26.000.

Amiya, Eizo, to Yamaha Corporation. Electronic keyboard musical instrument. 313,032, 12-18-90, Cl. D17-1.000.

Ammco Tools, Inc.: *See—*
Bogaerts, Leo C.; Murphy, John W.; and Norman, John S., *313,028,* Cl. D15-130.000.

Antonious, Anthony J. Golf club head. 313,056, 12-18-90, Cl. D21-217.000.

Archigraphics: *See—*
Zimmerman, Eric, 313,005, Cl. D13-134.000.

Armo Gesellschaft fur Bauelemente, Bau- und Wohnbedarf GmbH: See—
Quante, Heinrich, 312,977, Cl. D10-109.000.

Assenburg B.V.: See—
Scheffers, Adrianus J. M., 312,928, Cl. D6-429.000.

Atlas Copco Aktiebolag: *See—*
Persson, Mats A.; and Tranlov, Jan E., 313,027, Cl. D15-142.000.

Avecilla, Bonifacio; and Jacobs, Paul G., to EDIC. Power carpet cleaner. 313,095, 12-18-90, Cl. D32-22.000.

Aveni, Michael A., to Nike, Inc.; and Nike International, Ltd. Shoe sole foot frame. 312,918, 12-18-90, Cl. D2-314.000.

Aveni, Michael A., to Nike, Inc.; and Nike International, Ltd. Side panel for a shoe upper. 312,919, 12-18-90, Cl. D2-314.000.

Aveni, Michael A., to Nike, Inc.; and Nike International, Ltd. Shoe sole bottom. 312,920, 12-18-90, Cl. D2-320.000.

Azuelos, Pierre-Yves, to PYM, Inc. Radio or the like. 313,019, 12-18-90, Cl. D14-188.000.

Bally, Alexander: *See—*
Lind, Robert J.; Karwoski, Stanley G.; Lunzer, Lawrence J.; and *Bally, Alexander, 313,064,* Cl. D23-226.000.

Barrel Service Company: *See—*
Bramble, Richard A., 313,084, Cl. D26-113.000.

Bartholomew, John A.; and Grindstaff, Melvin A., to Fabreeka Products Company. Pattern for a conveyor belt. 313,101, 12-18-90, Cl. D34-29.000.

Bascom, Betty: *See—*
Bascom, Charles; and Bascom, Betty, 313,061, Cl. D22-134.000.

Bascom, Charles; and Bascom, Betty. Portable, collapsible ice fishing sled. 313,061, 12-18-90, Cl. D22-134.000.

Beecham Fragrances: *See—*
Mansau, Serge, 312,966, Cl. D9-384.000.

Beeecham Fragrances S.A.: *See—*
Mansau, Serge, 312,965, Cl. D9-377.000.

Bell Atlantic: *See—*
Bevacqua, Joseph P.; Collins, Thomas J.; Paddock, Joseph J., Jr.; and Eastep, Robert E., 313,008, Cl. D13-147.000.

Bell, Yvonne J. Pastry perforating tool. 312,950, 12-18-90, Cl. D7-694.000.

Berto, Clair E. Hand tool for installing rivets on caster wheel axles. 312,952, 12-18-90, Cl. D8-52.000.

Bertram, George W. Mailbox. 313,104, 12-18-90, Cl. D99-29.000.

Bevacqua, Joseph P.; Collins, Thomas J.; Paddock, Joseph J., Jr.; and Eastep, Robert E., to Bell Atlantic. Integral multiple transmission line interface terminal. 313,008, 12-18-90, Cl. D13-147.000.

Bianchi, John E. Buckle. 312,986, 12-18-90, Cl. D11-216.000.

Bigalk, Keith E. Waterbed sheet set. 312,939, 12-18-90, Cl. D6-602.000.

Bleazard, John G. Picture frame. 312,923, 12-18-90, Cl. D6-300.000.

Bloom, Kenneth H.: *See—*
Kolenda, David F.; and Bloom, Kenneth H., 313,023, Cl. D14-258.000.

Bloom, Robert. Combined hair coloring application bottle and timer. 313,087, 12-18-90, Cl. D28-20.000.

Boeri, Cini. Door handle. 312,956, 12-18-90, Cl. D8-308.000.

Bogaerts, Leo C.; Murphy, John W.; and Norman, John S., to Ammco Tools, Inc. Lathe. 313,028, 12-18-90, Cl. D15-130.000.

Boiocchi, Maurizio: *See—*
Guermandi, Romano; and Boiocchi, Maurizio, 312,993, Cl. D12-146.000.

Bonatrade International, Inc.: *See—*
Colani, Victor, 313,046, Cl. D19-78.000.

Boyd, Monty. Pocket spitoon. 313,098, 12-18-90, Cl. D34-2.000.

Bramble, Richard A., to Barrel Service Company. Flashlight end cap. 313,084, 12-18-90, Cl. D26-113.000.

Braun Aktiengesellschaft: *See—*
Ullmann, Roland, 313,090, Cl. D28-49.000.

Bridgestone Corporation: *See—*
Hayakawa, Toshio; and Shimada, Tatsuro, 312,994, Cl. D12-146.000.

Brown, Jeffrey C.: *See—*
Searle, Nathan H.; Brown, Jeffrey C.; and Kaneko, Steve, 313,011, Cl. D14-100.000.

Burgess, Karen E., to Gastro-Gnomes, Inc. Food and beverage menu holder for restaurant tables or the like. *313,050, 12-18-90,* Cl. D20-40.000.

Burglin, Robert E.: See—
Itaya, Sam S.; and Burglin, Robert E., 313,094, Cl. D32-19.000.

Burhardt, Daniel J., to Structure Source Corporation. Frame. 312,925, 12-18-90, Cl. D6-314.000.

Bustos, Rafael T., to Leggett & Platt, Incorporated. Beverage container display stand. 312,930, 12-18-90, Cl. D6-475.000.

C.C. Creative Consulating, S.A.: *See—*
Hendrikx, Peter, 313,052, Cl. D21-41.000.

C. D. Nelson Manufacturing Corporation: See—
Nelson, Clinton D., 312,929, Cl. D6-465.000.

Cadio Computer Co., Ltd.: *See—*
Kawashima, Kazuyo, 312,980, Cl. D10-132.000.

Cain, Alan. Encasing rudder for electric trolling motor. 313,003, 12-18-90, Cl. D12-317.000.

Cano, David A., to Ganeaux Industries, Inc. Vehicle ramp. 313,102, 12-18-90, Cl. D34-32.000.

Carlson, Kenneth L., to Chrysler Corporation. Front face of a vehicle wheel cover. 312,997, 12-18-90, Cl. D12-205.000.

Carlson, Kenneth L., to Chrysler Corporation. Front face of a vehicle wheel cover. 312,998, 12-18-90, Cl. D12-205.000.

Carmine, Roland; and McFadyen, Robert C., to Lever Brothers Company. Combined bottle and cap. *312,964, 12-18-90,* Cl. D9-376.000.

Casio Computer Co., Ltd.: *See—*
Katsuhara, Tatsuo; and Kitsuyu, Shigeru, 313,035, Cl. D17-1.000.
Koide, Masaki, 313,034, Cl. D17-1.000.

CBM Kabushiki Kaisha: *See—*
Funabashi, Yukinobu, 313,018, Cl. D14-156.000.

Chang, Haehie, to Non Nu. Inc. Seat belt protector. 312,921, 12-18-90, Cl. D2-639.000.

Chap, John P.; and Greenberg, Dorothy, to Selfix, Inc. Towel bar. *312,935, 12-18-90,* Cl. D6-549.000.

Cheetham, Trevor W.: *See—*
Welsh, Alan W.; and Cheetham, Trevor W., 313,072, Cl. D23-417.000.

Chin, Henry Y.: *See—*
Martinell, Steven W.; and Chin, Henry Y., 312,937, Cl. D6-552.000.

Chrysler Corporation: *See—*
Carlson, Kenneth L., 312,997, Cl. D12-205.000.
Carlson, Kenneth L., 312,998, Cl. D12-205.000.

Clarkson, James W., Jr. Battery-powered night light with foot-operated pressure switch pad for a commode. 313,082, 12-18-90, Cl. D26-24.000.

Claxton, Bruce A.: *See—*
Richards, Scott H.; Claxton, Bruce A.; and Yorio, Rudy, 313,024, Cl. D14-265.000.

Cleminshaw, Douglas R.; and Ranson, Paul A., to Scott Paper Company. Container for premoistened sheets. 312,963, 12-18-90, Cl. D9-310.000.

CMB Foodcan plc: *See—*
Jones, Bethan M., 312,967, Cl. D9-408.000.

Colani, Victor, to Bonatrade International, Inc. Combined holder for a notepad and writing instrument. 313,046, 12-18-90, Cl. D19-78.000.

Collins, Thomas J.: *See—*
Bevacqua, Joseph P.; Collins, Thomas J.; Paddock, Joseph J., Jr.; and Eastep, Robert E., 313,008, Cl. D13-147.000.

Compaq Computer Corporation: *See—*
Ryan, Dean J.; Lewis, Charles R.; and Goodrich, Donald S., 313,015, Cl. D14-102.000.

Congin, James; and Meditz, William F., to Waygo, Inc. Adjustable table base. 312,932, 12-18-90, Cl. D6-496.000.

Conner, James M.; and Sperling, Jac K., to Naiad Company. Front panel for a water temperature controller. 312,974, 12-18-90, Cl. D10-50.000.

Conroy, Christopher J.: *See—*
Lazarus, Harry G.; and Conroy, Christopher J., 312,988, Cl. D11-221.000.

Craft, Charles W., Jr.: *See—*
Murphy, Kent W.; Craft, Charles W., Jr.; and Mervar, Bob, 313,048, Cl. D19-34.100.

Creed, Gerald J.: *See—*
Davidson, Donald R.; Creed, Gerald J.; and Rogers, Howard D., 313,097, Cl. D32-71.000.

Daeyang Optical Co., Ltd.: *See—*
Lee, Choon J., 313,029, Cl. D16-133.000.

Daldrup, Klemens. Pastry. 312,914, 12-18-90, Cl. D1-122.000.

Dart Industries Inc.: *See—*
Wolff, Martin J., 312,968, Cl. D9-431.000.

Davidson, Donald R.; Creed, Gerald J.; and Rogers, Howard D., to SSMC Inc. Steam iron sole plate for seam opening or similar article. 313,097, 12-18-90, Cl. D32-71.000.

Deguchi, Atsushi: *See—*
Kim, Suk J.; Deguchi, Atsushi; and Yoshinaga, Sadao, 313,041, Cl. D19-42.000.

Disenos y Representaciones, S.A.: *See—*
Minarro, Tomas. C., 313,077, Cl. D25-16.000.

Dr. Ing. h.c.F. Porsche AG: *See*—
Soederberg, Richard, 313,100, Cl. D34-28.000.
Dumaine, Wildon. Punch ball paddle. 312,999, 12-18-90, Cl. D21-213.000.
E. R. Moore Co.: *See*—
Lazarus, Harry G.; and Conroy, Christopher J., 312,988, Cl. D11-221.000.
Early, Richard: *See*—
Siemon, John A.; and Early, Richard, 313,006, Cl. D13-147.000.
Siemon, John A.; and Early, Richard, 313,009, Cl. D13-147.000.
East, Vernon A. Combined placer mining suction nozzle and puddling nozzle. 313,025, 12-18-90, Cl. D15-21.000.
Eastep, Robert E.: *See*—
Bevacqua, Joseph P.; Collins, Thomas J.; Paddock, Joseph J., Jr.; and Eastep, Robert E., 313,008, Cl. D13-147.000.
EDIC: *See*—
Avecilla, Bonifacio; and Jacobs, Paul G., 313,095, Cl. D32-22.000.
Ehrmann, Alexander, to Alaron, Inc. Portable radio. 313,021, 12-18-90, Cl. D14-196.000.
Eisenbraun, Kenneth D. Combined cigarette lighter and clip. 313,085, 12-18-90, Cl. D27-142.000.
Eldon Industries, Inc.: *See*—
Evenson, Mel, 312,961, Cl. D8-373.000.
Evenson, Mel, 313,047, Cl. D19-99.000.
Embree, Donald; and Hamann, David L., to Rubbermaid Incorporated. Double hook. 312,960, 12-18-90, Cl. D8-367.000.
Evans, Graeme R., to Singleton Industries Pty. Ltd. Portable refrigerator. 313,026, 12-18-90, Cl. D15-83.000.
Evenson, Mel, to Eldon Industries, Inc. Hanger for use with a partition. 312,961, 12-18-90, Cl. D8-373.000.
Evenson, Mel, to Eldon Industries, Inc. Vertical file module. 313,047, 12-18-90, Cl. D19-99.000.
Expressions, Inc.: *See*—
Levy, Lawrence; Folloder, Brian; and Konen, Glenn, 312,922, Cl. D3-34.000.
Fabreeka Products Company: *See*—
Bartholomew, John A.; and Grindstaff, Melvin A., 313,101, Cl. D34-29.000.
Fischer, Milton J.: *See*—
Hoffman, Paul J.; and Fischer, Milton J., 313,106, Cl. D99-31.000.
Flanders, Andrew E. Combined loudspeaker cabinet, sound reflector and support base. 313,022, 12-18-90, Cl. D14-214.000.
Folloder, Brian: *See*—
Levy, Lawrence; Folloder, Brian; and Konen, Glenn, 312,922, Cl. D3-34.000.
Forbes, Hampton E., to Westvaco Corporation. Envelope. 313,040, 12-18-90, Cl. D19-3.000.
Ford Motor Company: *See*—
Kolenda, David F.; and Bloom, Kenneth H., 313,023, Cl. D14-258.000.
Forrest, Andrea. Plant protector. 312,951, 12-18-90, Cl. D8-1.000.
Foster, Brian C. Emergency light enclosure. 312,978, 12-18-90, Cl. D10-114.000.
Fujitsu Limited: *See*—
Watari, Masami; Tsuchida, Makoto; and Ohshita, Masaru, 313,016, Cl. D14-108.000.
Funabashi, Yukinobu, to CBM Kabushiki Kaisha. Compact disk player. 313,018, 12-18-90, Cl. D14-156.000.
Ganeaux Industries, Inc.: *See*—
Cano, David A., 313,102, Cl. D34-32.000.
Gastro-Gnomes, Inc.: *See*—
Burgess, Karen E., 313,050, Cl. D20-40.000.
Gebhardt, Frank H. Golf putter head. 313,057, 12-18-90, Cl. D21-217.000.
Gera, M. A., to Universal Furniture Industries, Inc. Sectional sofa. 312,926, 12-18-90, Cl. D6-335.000.
Gerdes, Ronald D. Trailer. 312,990, 12-18-90, Cl. D12-101.000.
Gilfert, Ted A.; and Morgan, Kevin W. Football helmet hat. 312,915, 12-18-90, Cl. D2-250.000.
Goddard, Frank W., legal representative: *See*—
Liebman, Arno J., deceased, 312,992, Cl. D12-128.000.
Gold Star Co., Ltd.: *See*—
Hong, Sa Y., 313,017, Cl. D14-135.000.
Goodrich, Donald S.: *See*—
Ryan, Dean J.; Lewis, Charles R.; and Goodrich, Donald S., 313,015, Cl. D14-102.000.
Graco Inc.: *See*—
Lind, Robert J.; Karwoski, Stanley G.; Lunzer, Lawrence J.; and Bally, Alexander, 313,064, Cl. D23-226.000.
Greenberg, Dorothy: *See*—
Chap, John P.; and Greenberg, Dorothy, 312,935, Cl. D6-549.000.
Greene, Jeffrey P., to Nu-Tec Incorporated. Stove. 313,070, 12-18-90, Cl. D23-346.000.
Grindstaff, Melvin A.: *See*—
Bartholomew, John A.; and Grindstaff, Melvin A., 313,101, Cl. D34-29.000.
Guberman, Mary C. Christmas wreath shadow box. 312,938, 12-18-90, Cl. D6-569.000.
Guermandi, Romano; and Boiocchi, Maurizio, to Pirelli Coordinamento Pneumatici S.p.A. Tire. 312,993, 12-18-90, Cl. D12-146.000.
Guess, Tom: *See*—
Shapland, Orville C.; and Guess, Tom, 312,934, Cl. D6-519.000.
Haker, Floyd H. Combined random number electronic gaming and coupon dispensing machine. 313,051, 12-18-90, Cl. D21-37.000.
Hall, Roger C., to Visador Company. Door light panel. 313,079, 12-18-90, Cl. D25-103.000.
Hall, Roger C., to Visador Company. Door light panel. 313,080, 12-18-90, Cl. D25-103.000.
Hall, Roger C., to Visador Company. Door light panel. 313,081, 12-18-90, Cl. D25-103.000.
Hamann, David L., to Rubbermaid Incorporated. Curved peg hook. 312,959, 12-18-90, Cl. D8-367.000.
Hamann, David L.: *See*—
Embree, Donald; and Hamann, David L., 312,960, Cl. D8-367.000.
Hanzawa, Tsuneo, to Kabushiki Kaisa Hanzawa Corporation. Electronic educational game. 313,045, 12-18-90, Cl. D19-60.000.
Hara, Kunio; and Tani, Atsushi, to Kabushiki Kaisha Toshiba. Electronic copying machine. 313,038, 12-18-90, Cl. D18-36.000.
Harju, Ronald D. Diaper. 313,076, 12-18-90, Cl. D24-50.000.
Harris Corporation: *See*—
Krietzman, William D., 313,013, Cl. D14-100.000.
Hasegawa, Hideaki; Iimura, Yoshio; and Nagahara, Kazuyuki, to Hitachi Koko Company, Ltd. Battery charger. 313,004, 12-18-90, Cl. D13-108.000.
Hashimoto, Masanori. Copier or similar article. 313,039, 12-18-90, Cl. D18-37.000.
Hatfield, Tinker L., to Nike, Inc.; and Nike International Ltd. Shoe upper. 312,916, 12-18-90, Cl. D2-314.000.
Hatfield, Tinker L., to Nike, Inc.; and Nike International Ltd. Cup shaped sole periphery. 312,917, 12-18-90, Cl. D2-314.000.
Hayakawa, Toshio; and Shimada, Tatsuro, to Bridgestone Corporation. Automobile tire. 312,994, 12-18-90, Cl. D12-146.000.
Hayden, Theodore R. Vacuum hose handle for a central vacuum system. 313,096, 12-18-90, Cl. D32-34.000.
Hendrikx, Peter, to C.C. Creative Consulating, S.A. Human figure game die. 313,052, 12-18-90, Cl. D21-41.000.
Henry, James A. Canoe container. 313,002, 12-18-90, Cl. D12-317.000.
Her, Ming-Long. Compact comb, lint brush and shoe horn assembly. 313,088, 12-18-90, Cl. D28-25.000.
Hirose Electric Co., Ltd.: *See*—
Nakamura, Masaru, 313,007, Cl. D13-147.000.
Hitachi Koko Company, Ltd.: *See*—
Hasegawa, Hideaki; Iimura, Yoshio; and Nagahara, Kazuyuki, 313,004, Cl. D13-108.000.
Hoffman, Paul J.; and Fischer, Milton J. Illuminated mail box with newspaper holder or similar article. 313,106, 12-18-90, Cl. D99-31.000.
Holterscheidt, Siegfried, to Walter Henkels, GmbH. Tape measure. 312,976, 12-18-90, Cl. D10-72.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Murata, Yutaka; Yokoyama, Kazuhiko; Koshiishi, Mutsumi; Makita, Akio; and Ishino, Yasuharu, 312,989, Cl. D12-87.000.
Hong, Sa Y., to Gold Star Co., Ltd. Video cassette recorder. 313,017, 12-18-90, Cl. D14-135.000.
Huang, Frank T. S. Vacuum jug. 312,942, 12-18-90, Cl. D7-303.000.
Huang, Soddy. Adjustable lamp. 313,083, 12-18-90, Cl. D26-65.000.
Huang, Yar-Shing. Door lock having a code-setting dial. 312,957, 12-18-90, Cl. D8-341.000.
I. W. Industries, Inc.: *See*—
Strignano, Joseph, 313,065, Cl. D23-242.000.
Strignano, Joseph, 313,066, Cl. D23-242.000.
Ichihara, Masuo: *See*—
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,944, Cl. D7-351.000.
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,945, Cl. D7-351.000.
Ichikawa, Kazuo, to Sony Corporation. Radio receiver. 313,020, 12-18-90, Cl. D14-192.000.
Iimura, Yoshio: *See*—
Hasegawa, Hideaki; Iimura, Yoshio; and Nagahara, Kazuyuki, 313,004, Cl. D13-108.000.
International Business Machines Corporation: *See*—
Kline, Jeffrey L.; and Sabella, Edward J., 313,014, Cl. D14-102.000.
International Water Technologies, Inc.: *See*—
Palmer, David G., 313,062, Cl. D23-207.000.
Ishino, Yasuharu: *See*—
Murata, Yutaka; Yokoyama, Kazuhiko; Koshiishi, Mutsumi; Makita, Akio; and Ishino, Yasuharu, 312,989, Cl. D12-87.000.
Itaya, Sam S.; and Burglin, Robert E., to Waxing Corporation of America, Inc. Automobile cleaning and waxing tool. 313,094, 12-18-90, Cl. D32-19.000.
Jacobs, Paul G.: *See*—
Avecilla, Bonifacio; and Jacobs, Paul G., 313,095, Cl. D32-22.000.
James, Marshall. Combined handkerchief, tie and belt holder. 312,940, 12-18-90, Cl. D6-571.000.
Jones, Bethan M., to CMB Foodcan plc. Bottle. 312,967, 12-18-90, Cl. D9-408.000.
Kabushiki Kaisa Hanzawa Corporation: *See*—
Hanzawa, Tsuneo, 313,045, Cl. D19-60.000.
Kabushiki Kaisha Toshiba: *See*—
Hara, Kunio; and Tani, Atsushi, 313,038, Cl. D18-36.000.
Kaneko, Steve: *See*—
Searle, Nathan H.; Brown, Jeffrey C.; and Kaneko, Steve, 313,011, Cl. D14-100.000.
Karwoski, Stanley G.: *See*—
Lind, Robert J.; Karwoski, Stanley G.; Lunzer, Lawrence J.; and Bally, Alexander, 313,064, Cl. D23-226.000.
Katsuhara, Tatsuo; and Kitsuyu, Shigeru, to Casio Computer Co., Ltd. Electronic keyboard musical instrument. 313,035, 12-18-90, Cl. D17-1.000.

Kaufman, Leon; and Kennedy, Colin B., to University of California, The Regents of the. Magnetic resonance imaging magnet housing. 313,073, 12-18-90, Cl. D24-2.000.

Kawano, Yusuke, to Pigeon Co., Ltd. Breast pump. 313,103, 12-18-90, Cl. D24-51.000.

Kawashima, Kazuyo, to Cadio Computer Co., Ltd. Protector for wrist watch. 312,980, 12-18-90, Cl. D10-132.000.

Kawneer Company, Inc.: *See—*
Rinehart, David M., 313,078, Cl. D25-60.000.

Kennedy, Colin B.: *See—*
Kaufman, Leon; and Kennedy, Colin B., 313,073, Cl. D24-2.000.

Kennedy, Patrick J. Coupon dispenser. 313,049, 12-18-90, Cl. D20-2.000.

Kijima, Masaichi; and Yajima, Nobumichi, to Aloka Co., Ltd.; and Ueda Japan Radio Co., Ltd. Ultrasonic aspirator for microscope neurosurgery. 313,074, 12-18-90, Cl. D24-26.000.

Kim, Suk J.; Deguchi, Atsushi; and Yoshinaga, Sadao, to Yoshinaga Prince Company Limited. Ball-point pen. 313,041, 12-18-90, Cl. D19-42.000.

Kim, Tae-Yik, to Nae Wae Semi-Conductor Co., Ltd. Wall-type photograph mount. 312,924, 12-18-90, Cl. D6-301.000.

Kitsuyu, Shigeru: *See—*
Katsuhara, Tatsuo; and Kitsuyu, Shigeru, 313,035, Cl. D17-1.000.

Klahre, Thomas H. Combined mailbox cover and planter box. 313,105, 12-18-90, Cl. D99-29.000.

Kline, Jeffrey L.; and Sabella, Edward J., to International Business Machines Corporation. Computer housing or the like. 313,014, 12-18-90, Cl. D14-102.000.

Kohler Co.: *See—*
Kohler, Herbert V., Jr.; and Reid, Mary J., 313,068, Cl. D23-294.000.

Kohler, Herbert V., Jr.; and Reid, Mary J., to Kohler Co. Sink. 313,068, 12-18-90, Cl. D23-294.000.

Koide, Masaki, to Casio Computer Co., Ltd. Electronic keyboard musical instrument. 313,034, 12-18-90, Cl. D17-1.000.

Kolenda, David F.; and Bloom, Kenneth H., to Ford Motor Company. Front control panel for a vehicular compact disc player. 313,023, 12-18-90, Cl. D14-258.000.

Konen, Glenn: *See—*
Levy, Lawrence; Folloder, Brian; and Konen, Glenn, 312,922, Cl. D3-34.000.

Kopanakis, Chrisoula: *See—*
Kopanakis, Nickie; and Kopanakis, Chrisoula, 312,947, Cl. D7-507.000.

Kopanakis, Nickie; and Kopanakis, Chrisoula. Combined tumbler rack and tumblers. 312,947, 12-18-90, Cl. D7-507.000.

Kosako, Mikio; and Tatsuta, Yoichio, to Sharp Corporation. Portable copying machine. 313,037, 12-18-90, Cl. D18-36.000.

Koshiishi, Mutsumi: *See—*
Murata, Yutaka; Yokoyama, Kazuhiko; Koshiishi, Mutsumi; Makita, Akio; and Ishino, Yasuharu, 312,989, Cl. D12-87.000.

Kotake, Naoyuki; and Mikiya, Toshio, to Nitto Kohki Co., Ltd. Quick release coupling. 313,067, 12-18-90, Cl. D23-262.000.

Krietzman, William D., to Harris Corporation. Multiplexer bay for data communication systems. 313,013, 12-18-90, Cl. D14-100.000.

Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 312,944, 12-18-90, Cl. D7-351.000.

Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 312,945, 12-18-90, Cl. D7-351.000.

Kuli, Amiel. Tractor seat belt holder set. 312,987, 12-18-90, Cl. D11-218.000.

Kuo, Ming-Chuan. Dental floss applicator. 313,091, 12-18-90, Cl. D28-64.000.

L. M. Ericsson Pty. Ltd.: *See—*
Pataki, Robert; and Patsias, Carol, 313,012, Cl. D14-100.000.

Lazarus, Harry G.; and Conroy, Christopher J., to E. R. Moore Co. Zipper pull. 312,988, 12-18-90, Cl. D11-221.000.

Lecce, Fernando, to Lecce Pen Company, S.r.l. Writing instrument. 313,042, 12-18-90, Cl. D19-48.000.

Lecce Pen Company, S.r.l.: *See—*
Lecce, Fernando, 313,042, Cl. D19-48.000.

Lee, Choon J., to Daeyang Optical Co., Ltd. Binoculars. 313,029, 12-18-90, Cl. D16-133.000.

Leggett & Platt, Incorporated: *See—*
Bustos, Rafael T., 312,930, Cl. D6-475.000.

Lever Brothers Company: *See—*
Carmine, Roland; and McFadyen, Robert C., 312,964, Cl. D9-376.000.

Levy, Lawrence; Folloder, Brian; and Konen, Glenn, to Expressions, Inc. Holder for eyeglasses. 312,922, 12-18-90, Cl. D3-34.000.

Lewis, Charles R.: *See—*
Ryan, Dean J.; Lewis, Charles R.; and Goodrich, Donald S., 313,015, Cl. D14-102.000.

Liebman, Arno J., deceased (Goddard, Frank W., legal representative). Stretcher. 312,992, 12-18-90, Cl. D12-128.000.

Lim, P. David. Ski rack. 312,936, 12-18-90, Cl. D6-552.000.

Lind, Robert J.; Karwoski, Stanley G.; Lunzer, Lawrence J.; and Bally, Alexander, to Graco Inc. Electrostatic spray gun. 313,064, 12-18-90, Cl. D23-226.000.

Lloyd, Dennis M. Headrest for use primarily in a motor vehicle. 312,933, 12-18-90, Cl. D6-502.000.

Lohrum, Johnnie; and Weber, David C. Bicycle. 312,991, 12-18-90, Cl. D12-108.000.

Lunzer, Lawrence J.: *See—*
Lind, Robert J.; Karwoski, Stanley G.; Lunzer, Lawrence J.; and Bally, Alexander, 313,064, Cl. D23-226.000.

Macdonald, Bruce M.: *See—*
Martin, Thomas J.; and Macdonald, Bruce M., 312,927, Cl. D6-423.000.

Makita, Akio: *See—*
Murata, Yutaka; Yokoyama, Kazuhiko; Koshiishi, Mutsumi; Makita, Akio; and Ishino, Yasuharu, 312,989, Cl. D12-87.000.

Mansau, Serge, to Beeecham Fragrances S.A. Perfume bottle. 312,965, 12-18-90, Cl. D9-377.000.

Mansau, Serge, to Beecham Fragrances. Lieberman; Lucy. 312,966, 12-18-90, Cl. D9-384.000.

Mardikian, Albert A. Jet ski. 313,001, 12-18-90, Cl. D12-307.000.

Mariol, James F.: *See—*
Mariol, John V., 313,075, Cl. D24-47.000.

Mariol, John V., to Mariol, James F. Baby feeding bottle. 313,075, 12-18-90, Cl. D24-47.000.

Martin, Thomas J.; and Macdonald, Bruce M., to Tetrad Marketing-/Sales Ltd. Modular office work station. 312,927, 12-18-90, Cl. D6-423.000.

Martinell, Steven W.; and Chin, Henry Y., to Racor, Inc. Wall mounted golf equipment storage rack. 312,937, 12-18-90, Cl. D6-552.000.

Martinez, Carlos M.: *See—*
Oesterheld, Klaus; and Martinez, Carlos M., 312,979, Cl. D10-114.000.

Matoba, Hisayoshi: *See—*
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,944, Cl. D7-351.000.
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,945, Cl. D7-351.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,944, Cl. D7-351.000.
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,945, Cl. D7-351.000.

McCharen, Victoria. Doll. 313,053, 12-18-90, Cl. D21-171.000.

McCharen, Victoria. Doll. 313,054, 12-18-90, Cl. D21-171.000.

McCormick, David D., to Rival Manufacturing Company. Electrical heater. 313,069, 12-18-90, Cl. D23-335.000.

McFadyen, Robert C.: *See—*
Carmine, Roland; and McFadyen, Robert C., 312,964, Cl. D9-376.000.

Meditz, William F.: *See—*
Congin, James; and Meditz, William F., 312,932, Cl. D6-496.000.

Melamed, Sam. Envelope opener. 312,955, 12-18-90, Cl. D8-102.000.

Mervar, Bob: *See—*
Murphy, Kent W.; Craft, Charles W., Jr.; and Mervar, Bob, 313,048, Cl. D19-34.100.

Mikiya, Toshio: *See—*
Kotake, Naoyuki; and Mikiya, Toshio, 313,067, Cl. D23-262.000.

Minarro, Tomas. C., to Disenos y Representaciones, S.A. Kiosk. 313,077, 12-18-90, Cl. D25-16.000.

Mizuma, Kensuke: *See—*
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,944, Cl. D7-351.000.
Kubo, Masayoshi; Ichihara, Masuo; Mizuma, Kensuke; and Matoba, Hisayoshi, 312,945, Cl. D7-351.000.

Mizushima, Kazuyuki, to Yamaha Corp. Electronic keyboard musical instrument. 313,033, 12-18-90, Cl. D17-1.000.

Moodley, Sundru. Jewelry clasp. 312,982, 12-18-90, Cl. D11-87.000.

Morgan, Kevin W.: *See—*
Gilfert, Ted A.; and Morgan, Kevin W., 312,915, Cl. D2-250.000.

Morton, Jeffrey D. Camera mount. 313,030, 12-18-90, Cl. D16-242.000.

Motorola, Inc.: *See—*
Richards, Scott H.; Claxton, Bruce A.; and Yorio, Rudy, 313,024, Cl. D14-265.000.

Murata, Yutaka; Yokoyama, Kazuhiko; Koshiishi, Mutsumi; Makita, Akio; and Ishino, Yasuharu, to Honda Giken Kogyo Kabushiki Kaisha. Four wheeled vehicle. 312,989, 12-18-90, Cl. D12-87.000.

Murphy, John W.: *See—*
Bogaerts, Leo C.; Murphy, John W.; and Norman, John S., 313,028, Cl. D15-130.000.

Murphy, Kent W.; Craft, Charles W., Jr.; and Mervar, Bob, to Rubbermaid Incorporated. Bookend. 313,048, 12-18-90, Cl. D19-34.100.

Nae Wae Semi-Conductor Co., Ltd.: *See—*
Kim, Tae-Yik, 312,924, Cl. D6-301.000.

Nagahara, Kazuyuki: *See—*
Hasegawa, Hideaki; Iimura, Yoshio; and Nagahara, Kazuyuki, 313,004, Cl. D13-108.000.

Naiad Company: *See—*
Conner, James M.; and Sperling, Jac K., 312,974, Cl. D10-50.000.

Nakamura, Masaru, to Hirose Electric Co., Ltd. Printed-circuit board connector. 313,007, 12-18-90, Cl. D13-147.000.

Nelson, Clinton D., to C. D. Nelson Manufacturing Corporation. Jewelry rack. 312,929, 12-18-90, Cl. D6-465.000.

Nike, Inc.: *See—*
Aveni, Michael A., 312,918, Cl. D2-314.000.
Aveni, Michael A., 312,919, Cl. D2-314.000.
Aveni, Michael A., 312,920, Cl. D2-320.000.
Hatfield, Tinker L., 312,916, Cl. D2-314.000.
Hatfield, Tinker L., 312,917, Cl. D2-314.000.

Nike International, Ltd.: *See—*
Aveni, Michael A., 312,918, Cl. D2-314.000.
Aveni, Michael A., 312,919, Cl. D2-314.000.
Aveni, Michael A., 312,920, Cl. D2-320.000.

Hatfield, Tinker L., 312,916, Cl. D2-314.000.
Hatfield, Tinker L., 312,917, Cl. D2-314.000.
Nilsson, Ake E. Ear muff. 313,092, 12-18-90, Cl. D29-17.000.
Nitta, Tomio, to Tokai Corporation. Cigarette lighter. 313,086, 12-18-90, Cl. D27-156.000.
Nitto Kohki Co., Ltd.: *See—*
Kotake, Naoyuki; and Mikiya, Toshio, 313,067, Cl. D23-262.000.
Non Nu. Inc.: *See—*
Chang, Haehie, 312,921, Cl. D2-639.000.
Norman, John S.: *See—*
Bogaerts, Leo C.; Murphy, John W.; and Norman, John S., 313,028, Cl. D15-130.000.
North American Philips Corporation: *See—*
Oesterheld, Klaus; and Martinez, Carlos M., 312,979, Cl. D10-114.000.
Nu-Tec Incorporated: *See—*
Greene, Jeffrey P., 313,070, Cl. D23-346.000.
Odaka, Seiji, to Seikosha Co., Ltd. Clock. 312,972, 12-18-90, Cl. D10-28.000.
Oesterheld, Klaus; and Martinez, Carlos M., to North American Philips Corporation. Surface mountable LED indicator light. 312,979, 12-18-90, Cl. D10-114.000.
Ohshita, Masaru: *See—*
Watari, Masami; Tsuchida, Makoto; and Ohshita, Masaru, 313,016, Cl. D14-108.000.
Overton, Kevin C., to W. H. Overton Limited. Shelf bracket. 312,962, 12-18-90, Cl. D8-381.000.
Paddock, Joseph J., Jr.: *See—*
Bevacqua, Joseph P.; Collins, Thomas J.; Paddock, Joseph J., Jr.; and Eastep, Robert E., 313,008, Cl. D13-147.000.
Palmer, Barbara. Charm bracelet. 312,981, 12-18-90, Cl. D11-83.000.
Palmer, David G., to International Water Technologies, Inc. Water distilling apparatus. 313,062, 12-18-90, Cl. D23-207.000.
Partex Fabriksaktiebolag: *See—*
Skarin, Lars, 313,010, Cl. D13-157.000.
Pataki, Robert; and Patsias, Carol, to L. M. Ericsson Pty. Ltd. Control console or similar article. 313,012, 12-18-90, Cl. D14-100.000.
Patsias, Carol: *See—*
Pataki, Robert; and Patsias, Carol, 313,012, Cl. D14-100.000.
Periso S.A.: *See—*
Scherrer, Fernand, 313,071, Cl. D23-364.000.
Persch, Johannes, to Pico Getranke GmbH. Lockable carrier for bottles, or similar article. 312,949, 12-18-90, Cl. D7-598.000.
Persson, Mats A.; and Tranlov, Jan E., to Atlas Copco Aktiebolag. Joystick handle for electrical-hydraulic control systems. 313,027, 12-18-90, Cl. D15-142.000.
Pico Getranke GmbH: *See—*
Persch, Johannes, 312,949, Cl. D7-598.000.
Pigeon Co., Ltd.: *See—*
Kawano, Yusuke, 313,103, Cl. D24-51.000.
Piltz, Lars-Erik. Pull tab cover. 312,969, 12-18-90, Cl. D9-438.000.
Pirelli Coordinamento Pneumatici S.p.A.: *See—*
Guermandi, Romano; and Boiocchi, Maurizio, 312,993, Cl. D12-146.000.
Powell, Alfred J. Modular planter trough. 312,983, 12-18-90, Cl. D11-156.000.
Powers, Ronald H., to Suzuki Jidohsa Kogyo Kabushiki Kaisha. Water craft. 313,000, 12-18-90, Cl. D12-307.000.
Proform Fitness Products, Inc.: *See—*
Watterson, Scott R., 313,055, Cl. D21-194.000.
PYM, Inc.: *See—*
Azuelos, Pierre-Yves, 313,019, Cl. D14-188.000.
Quaker Oats Company, The: *See—*
Wehmeyer, Stephen D., 313,058, Cl. D21-252.000.
Quante, Heinrich, to Armo Gesellschaft fur Bauelemente, Bau- und Wohnbedarf GmbH. Traffic guide post. 312,977, 12-18-90, Cl. D10-109.000.
Racor, Inc.: *See—*
Martinell, Steven W.; and Chin, Henry Y., 312,937, Cl. D6-552.000.
Radosavljevic, Svetislav M. Dial for world time zones. 313,043, 12-18-90, Cl. D19-59.000.
Ranson, Paul A.: *See—*
Cleminshaw, Douglas R.; and Ranson, Paul A., 312,963, Cl. D9-310.000.
Redring Electric Limited: *See—*
Welsh, Alan W.; and Cheetham, Trevor W., 313,072, Cl. D23-417.000.
Reid, Mary J.: *See—*
Kohler, Herbert V., Jr.; and Reid, Mary J., 313,068, Cl. D23-294.000.
Richards, Scott H.; Claxton, Bruce A.; and Yorio, Rudy, to Motorola, Inc. Vehicular adaptor for a portable radio. 313,024, 12-18-90, Cl. D14-265.000.
Richardson, David C. Clock. 312,970, 12-18-90, Cl. D10-6.000.
Rinehart, David M., to Kawneer Company, Inc. Frame member. 313,078, 12-18-90, Cl. D25-60.000.
Rival Manufacturing Company: *See—*
McCormick, David D., 313,069, Cl. D23-335.000.
Rogers, Howard D.: *See—*
Davidson, Donald R.; Creed, Gerald J.; and Rogers, Howard D., 313,097, Cl. D32-71.000.
Rubbermaid Incorporated: *See—*
Embree, Donald; and Hamann, David L., 312,960, Cl. D8-367.000.
Hamann, David L., 312,959, Cl. D8-367.000.
Murphy, Kent W.; Craft, Charles W., Jr.; and Mervar, Bob, 313,048, Cl. D19-34.100.
Ryan, Dean J.; Lewis, Charles R.; and Goodrich, Donald S., to Compaq Computer Corporation. Personal computer. 313,015, 12-18-90, Cl. D14-102.000.
Sabella, Edward J.: *See—*
Kline, Jeffrey L.; and Sabella, Edward J., 313,014, Cl. D14-102.000.
Salton/Maxim Housewares Group: *See—*
Sanchez, Maria G., 312,943, Cl. D7-330.000.
Sanchez, Maria G., to Salton/Maxim Housewares Group. Toaster. 312,943, 12-18-90, Cl. D7-330.000.
Scheffers, Adrianus J. M., to Assenburg B.V. Adjustable table. 312,928, 12-18-90, Cl. D6-429.000.
Scherrer, Fernand, to Periso S.A. Air purifier and ionizer. 313,071, 12-18-90, Cl. D23-364.000.
Scheurer, Stephen M., to Texas Recreation Corporation. Floating thermometer housing. 312,975, 12-18-90, Cl. D10-57.000.
Schoen, E. David. Food support. 312,946, 12-18-90, Cl. D7-504.000.
Schuler, Jean I. Curling iron cover. 313,089, 12-18-90, Cl. D28-38.000.
Scott Paper Company: *See—*
Cleminshaw, Douglas R.; and Ranson, Paul A., 312,963, Cl. D9-310.000.
Seaco, Inc.: *See—*
Seaver, John B., 312,996, Cl. D12-157.000.
Searle, Nathan H.; Brown, Jeffrey C.; and Kaneko, Steve, to Advanced Digital Information Corporation. Data cartridge backup unit. 313,011, 12-18-90, Cl. D14-100.000.
Sears, Benny. Archery overdraw. 313,059, 12-18-90, Cl. D22-107.000.
Seaver, John B., to Seaco, Inc. Exterior shell of a trunk door of a car top carrier or similar article. 312,996, 12-18-90, Cl. D12-157.000.
Seikosha Co., Ltd.: *See—*
Odaka, Seiji, 312,972, Cl. D10-28.000.
Takashima, Asao, 312,971, Cl. D10-10.000.
Tanaka, Mamoru, 313,093, Cl. D30-122.000.
Selfix, Inc.: *See—*
Chap, John P.; and Greenberg, Dorothy, 312,935, Cl. D6-549.000.
Shapland, Orville C.; and Guess, Tom. Combined tissue dispenser and trash receptacle. 312,934, 12-18-90, Cl. D6-519.000.
Sharp Corporation: *See—*
Kosako, Mikio; and Tatsuta, Yoichio, 313,037, Cl. D18-36.000.
Shimada, Tatsuro: *See—*
Hayakawa, Toshio; and Shimada, Tatsuro, 312,994, Cl. D12-146.000.
Siemon Company, The: *See—*
Siemon, John A.; and Early, Richard, 313,006, Cl. D13-147.000.
Siemon, John A.; and Early, Richard, 313,009, Cl. D13-147.000.
Siemon, John A.; and Early, Richard, to Siemon Company, The. Communications block connector adapter. 313,006, 12-18-90, Cl. D13-147.000.
Siemon, John A.; and Early, Richard, to Siemon Company, The. Dual modular jack adapter. 313,009, 12-18-90, Cl. D13-147.000.
Silber, Cory J.: *See—*
Vanderpol, Jerald; and Silber, Cory J., 312,953, Cl. D8-60.000.
Singleton Industries Pty. Ltd.: *See—*
Evans, Graeme R., 313,026, Cl. D15-83.000.
Skarin, Lars, to Partex Fabriksaktiebolag. Dual function marking sleeve for electric wires and cables. 313,010, 12-18-90, Cl. D13-157.000.
Soederberg, Richard, to Dr. Ing. h.c.F. Porsche AG. Fork lift. 313,100, 12-18-90, Cl. D34-28.000.
Sony Corporation: *See—*
Ichikawa, Kazuo, 313,020, Cl. D14-192.000.
Spak, Michael J. Combination doll and book. 313,044, 12-18-90, Cl. D19-59.000.
Sperling, Jac K.: *See—*
Conner, James M.; and Sperling, Jac K., 312,974, Cl. D10-50.000.
Sprick, Richard H. Collar stay. 312,984, 12-18-90, Cl. D11-213.000.
Sprick, Richard H. Collar stay. 312,985, 12-18-90, Cl. D11-213.000.
Sroubek, Karel. Shower head with multiple nozzles. 313,063, 12-18-90, Cl. D23-213.000.
SSMC Inc.: *See—*
Davidson, Donald R.; Creed, Gerald J.; and Rogers, Howard D., 313,097, Cl. D32-71.000.
Stanley, Mary E. Edible cone. 312,913, 12-18-90, Cl. D1-118.000.
Strignano, Joseph, to I. W. Industries, Inc. Faucet set. 313,065, 12-18-90, Cl. D23-242.000.
Strignano, Joseph, to I. W. Industries, Inc. Faucet set. 313,066, 12-18-90, Cl. D23-242.000.
Structure Source Corporation: *See—*
Burhardt, Daniel J., 312,925, Cl. D6-314.000.
Sumitomo Rubber Industries, Ltd.: *See—*
Tagashira, Kenji, 312,995, Cl. D12-147.000.
Suzuki Jidohsa Kogyo Kabushiki Kaisha: *See—*
Powers, Ronald H., 313,000, Cl. D12-307.000.
Syracuse China Corporation: *See—*
Unger, Steve A., 312,948, Cl. D7-585.000.
Tagashira, Kenji, to Sumitomo Rubber Industries, Ltd. Automobile tire. 312,995, 12-18-90, Cl. D12-147.000.
Takashima, Asao, to Seikosha Co., Ltd. World clock. 312,971, 12-18-90, Cl. D10-10.000.
Tanaka, Mamoru, to Seikosha Co., Ltd. Automatic food dispenser for aquariums or the like. 313,093, 12-18-90, Cl. D30-122.000.
Tani, Atsushi: *See—*
Hara, Kunio; and Tani, Atsushi, 313,038, Cl. D18-36.000.
Tasley, Rickey. Picnic cooler carrier. 313,099, 12-18-90, Cl. D34-17.000.
Tatsuta, Yoichio: *See—*
Kosako, Mikio; and Tatsuta, Yoichio, 313,037, Cl. D18-36.000.

Tetrad Marketing/Sales Ltd.: *See—*
Martin, Thomas J.; and Macdonald, Bruce M., 312,927, Cl. D6-423.000.
Texas Recreation Corporation: *See—*
Scheurer, Stephen M., 312,975, Cl. D10-57.000.
Tokai Corporation: *See—*
Nitta, Tomio, 313,086, Cl. D27-156.000.
Tranlov, Jan E.: *See—*
Persson, Mats A.; and Tranlov, Jan E., 313,027, Cl. D15-142.000.
Tri Tool Inc.: *See—*
Vanderpol, Jerald; and Silber, Cory J., 312,953, Cl. D8-60.000.
Tsuchida, Makoto: *See—*
Watari, Masami; Tsuchida, Makoto; and Ohshita, Masaru, 313,016, Cl. D14-108.000.
Ueda Japan Radio Co., Ltd.: *See—*
Kijima, Masaichi; and Yajima, Nobumichi, 313,074, Cl. D24-26.000.
Ullmann, Roland, to Braun Aktiengesellschaft. Electric dry shaver. 313,090, 12-18-90, Cl. D28-49.000.
Unger, Steve A., to Syracuse China Corporation. Bowl or similar article. 312,948, 12-18-90, Cl. D7-585.000.
Universal Furniture Industries, Inc.: *See—*
Gera, M. A., 312,926, Cl. D6-335.000.
University of California, The Regents of the: *See—*
Kaufman, Leon; and Kennedy, Colin B., 313,073, Cl. D24-2.000.
Vanderpol, Jerald; and Silber, Cory J., to Tri Tool Inc. Tube cutting tool. 312,953, 12-18-90, Cl. D8-60.000.
Visador Company: *See—*
Hall, Roger C., 313,079, Cl. D25-103.000.
Hall, Roger C., 313,080, Cl. D25-103.000.
Hall, Roger C., 313,081, Cl. D25-103.000.
W. H. Overton Limited: *See—*
Overton, Kevin C., 312,962, Cl. D8-381.000.
Walter Henkels, GmbH: *See—*
Holterscheidt, Siegfried, 312,976, Cl. D10-72.000.
Watari, Masami; Tsuchida, Makoto; and Ohshita, Masaru, to Fujitsu Limited. Automatic cartridge loader for magnetic tape unit. 313,016, 12-18-90, Cl. D14-108.000.
Watterson, Scott R., to Proform Fitness Products, Inc. Exercise cycle console. 313,055, 12-18-90, Cl. D21-194.000.
Waxing Corporation of America, Inc.: *See—*
Itaya, Sam S.; and Burglin, Robert E., 313,094, Cl. D32-19.000.
Waygo, Inc.: *See—*
Congin, James; and Meditz, William F., 312,932, Cl. D6-496.000.
Weber, David C.: *See—*
Lohrum, Johnnie; and Weber, David C., 312,991, Cl. D12-108.000.
Wehmeyer, Stephen D., to Quaker Oats Company, The. Sand box. 313,058, 12-18-90, Cl. D21-252.000.
Welsh, Alan W.; and Cheetham, Trevor W., to Redring Electric Limited. Electric heater element for use in a radiant heater for a glass ceramic hob. 313,072, 12-18-90, Cl. D23-417.000.
Westfall, Beulah C.: *See—*
Westfall, William P.; and Westfall, Beulah C., 312,931, Cl. D6-491.000.
Westfall, William P.; and Westfall, Beulah C. Sun shade for a lawn chair or the like. 312,931, 12-18-90, Cl. D6-491.000.
Westvaco Corporation: *See—*
Forbes, Hampton E., 313,040, Cl. D19-3.000.
Wilbanks, John W. Combined screwdriver bit and sheet metal cutting element for a combination hand tool. 312,954, 12-18-90, Cl. D8-82.000.
Wintz, David G. Guitar head. 313,036, 12-18-90, Cl. D17-20.000.
Wolff, Martin J., to Dart Industries Inc. Food container or the like. 312,968, 12-18-90, Cl. D9-431.000.
Woomer, Benjamin E. Wristwatch. 312,973, 12-18-90, Cl. D10-39.000.
Yajima, Nobumichi: *See—*
Kijima, Masaichi; and Yajima, Nobumichi, 313,074, Cl. D24-26.000.
Yamaha Corporation: *See—*
Amiya, Eizo, 313,032, Cl. D17-1.000.
Mizushima, Kazuyuki, 313,033, Cl. D17-1.000.
Yamawaki, Yasuo, 313,031, Cl. D17-1.000.
Yamawaki, Yasuo, to Yamaha Corporation. Electronic keyboard musical instrument. 313,031, 12-18-90, Cl. D17-1.000.
Yokoyama, Kazuhiko: *See—*
Murata, Yutaka; Yokoyama, Kazuhiko; Koshiishi, Mutsumi; Makita, Akio; and Ishino, Yasuharu, 312,989, Cl. D12-87.000.
Yorio, Rudy: *See—*
Richards, Scott H.; Claxton, Bruce A.; and Yorio, Rudy, 313,024, Cl. D14-265.000.
Yoshinaga Prince Company Limited: *See—*
Kim, Suk J.; Deguchi, Atsushi; and Yoshinaga, Sadao, 313,041, Cl. D19-42.000.
Yoshinaga, Sadao: *See—*
Kim, Suk J.; Deguchi, Atsushi; and Yoshinaga, Sadao, 313,041, Cl. D19-42.000.
Zimmerman, Eric, to Archigraphics. Decorative light socket. 313,005, 12-18-90, Cl. D13-134.000.
Zivin, Elliott N. Serving tray. 312,941, 12-18-90, Cl. D7-545.000.

LIST OF PLANT PATENTEES

Akerboom, Petrus J.: *See—*
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J., 7,397, Cl. 68.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J., 7,399, Cl. 68.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J., 7,400, Cl. 68.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J., 7,401, Cl. 68.000.
Cooper, Calvin L., to Oregon Rootstock, Inc. Apple tree Treco Spur Red Gala No. 42. 7,396, 12-18-90, Cl. 34.000.
Gebr. Man C.V.: *See—*
Man, Jan, 7,398, Cl. 68.000.
Man, Jan, to Gebr. Man C.V. Begonia cultivar Manderijn. 7,398, 12-18-90, Cl. 68.000.
Oregon Rootstock, Inc.: *See—*
Cooper, Calvin L., 7,396, Cl. 34.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J. Aster plant named White Butterfly. 7,397, 12-18-90, Cl. 68.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J. Aster plant named Blue Butterfly. 7,399, 12-18-90, Cl. 68.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J. Aster plant named Rose Butterfly. 7,400, 12-18-90, Cl. 68.000.
Tvrtkovic-Sahin, Zelimir K.; and Akerboom, Petrus J. Aster plant named Pink Butterfly. 7,401, 12-18-90, Cl. 68.000.

CLASSIFICATION OF PATENTS

ISSUED DECEMBER 18, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

20 4,977,621
59 4,977,622
69 4,977,623
152 R 4,977,624
170 4,977,625
250 4,977,626
437 4,977,627

CLASS 4

237 4,977,628

CLASS 5

61 4,977,629
81 R 4,977,630
118 4,977,631
413 4,977,632
434 4,977,634
453 4,977,633

CLASS 8

94.27 4,978,361
581 4,978,363
645 4,978,364

CLASS 14

71.3 4,977,635
73 4,977,636

CLASS 15

104 R 4,977,637
301 4,977,638
319 4,977,639
339 4,977,640

CLASS 16

121 4,977,641
257 4,977,642

CLASS 18

506 4,978,362

CLASS 19

200 4,977,645

CLASS 24

68 CD 4,977,646
389 4,977,662
573.1 4,977,648
4,977,649
599.5 4,977,647
614 4,977,650

CLASS 26

106 4,977,651

CLASS 27

1 4,977,652

CLASS 28

115 4,977,653
278 4,977,654

CLASS 29

1.21 4,977,657
25.01 4,977,658
25.35 4,977,655
116.2 Re.33,490
121.8 4,977,656
235 4,977,659
251 4,977,660
261 4,977,661
525.2 4,977,663
563 4,977,664
564.3 4,977,665
603 4,977,666
784 4,977,667
852 4,977,668

CLASS 30

41 4,977,669
49 4,977,670
90.2 4,977,671
233 4,977,672
294 4,977,673
379.5 4,977,674

CLASS 33

028 4,977,675
254 4,977,676
265 4,977,677
4,977,678
316 4,977,679
508 4,977,680
544.5 4,977,681
550 4,977,682
621 4,977,683
766 4,977,684
783 4,977,685

CLASS 34

9.5 4,977,686
51 4,977,687
92 4,977,688
243 C 4,977,689
243 R 4,977,690

CLASS 36

44 4,977,691
119 4,977,692
120 4,977,693

CLASS 40

159 4,977,694
541 4,977,695
605 4,977,696
606 4,977,697
618 4,977,698

CLASS 43

4 4,977,699
57.2 4,977,700
122 4,977,701

CLASS 44

281 4,978,367
301 4,978,365
334 4,978,366

CLASS 47

1.1 4,977,702
84 4,977,703

CLASS 48

87 4,978,368
197 R 4,978,369

CLASS 49

362 4,977,704
478 4,977,705
479 4,977,706

CLASS 51

18 4,977,707
170 R 4,977,708
206 R 4,977,709
309 4,977,710
380 4,977,712

CLASS 52

30 B1 3,921,346
65 4,977,713
95 4,977,714
223 R 4,977,715
235 4,977,716
4,977,717
288 4,977,718
309.8 4,977,711
396 4,977,719
408 4,977,720
410 4,977,721
602 4,977,730
731 4,977,722
747 4,977,731

CLASS 53

110 4,977,723
456 4,977,724
501 4,977,725
542 4,977,726
543 4,977,727
567 4,977,728
574 4,977,729

CLASS 55

36 4,978,370
102 4,978,371
132 4,978,372
165 4,978,374
165.000 4,978,373
493 4,978,375

CLASS 56

11.4 4,977,732
14.7 4,977,733
15.9 4,977,734
295 4,977,735
330 4,977,736

CLASS 57

97 4,977,737
281 4,977,738
293 4,977,739

CLASS 60

39.463 4,977,740
310 4,977,741
444 4,977,760
525 4,977,742
605.3 4,977,743
641.15 4,977,744

CLASS 62

10 4,977,745
22 4,977,746
50.1 4,977,747
51.1 4,977,748
4,977,749
77 4,977,750
81 4,977,751
115 4,977,752
121 4,977,753
248 4,977,754
304 4,977,755
314 4,977,756

CLASS 63

15 4,977,757

CLASS 65

3.11 4,978,376
4,978,377
3.12 4,978,378
18.2 4,978,379
260 4,978,380

CLASS 66

27 4,977,758
81 4,977,759

CLASS 68

177 4,977,761

CLASS 70

14 4,977,762
54 4,977,763
63 4,977,764
226 4,977,974
268 4,977,765
326 4,977,766
406 4,977,767
491 4,977,768

CLASS 71

77 4,978,381
92 4,978,382
93 4,978,383
94 4,978,384
4,978,385
121 4,978,386

CLASS 72

26 4,977,769
175 4,977,770
218 4,977,771
336 4,977,772
353.6 4,977,773
456 4,977,774

CLASS 73

1 G 4,977,776
1.00 C 4,977,775
37.5 4,977,777
597 4,977,778
606 4,977,779
644 4,977,780
861.22 4,977,781
862.29 4,977,782
862.39 4,977,783
862.54 4,977,784
863.12 4,977,785
864.24 4,977,786

CLASS 74

54 4,977,787
424.8 R 4,977,788
470 4,977,791
475 4,977,789
479 4,977,790
502.2 4,977,792
567 4,977,793
572 4,977,794
575 4,977,795
665 T 4,977,796
866 4,977,797
867 4,977,798

CLASS 75

445 4,978,387

CLASS 81

53.2 4,977,799
436 4,977,800

CLASS 82

127 4,977,801

CLASS 83

13 4,977,802
23 4,977,803
76.7 4,977,804
76.8 4,977,805
105 4,977,806
676 4,977,807

CLASS 84

291 4,977,808
395 4,977,809
422.3 4,977,810
600 4,977,811
634 4,977,812
722 4,977,813

CLASS 89

1.4 4,977,814
180 4,977,815

CLASS 91

375 R 4,977,816

CLASS 92

31 4,977,817

CLASS 98

31.6 4,977,818

CLASS 99

279 4,977,819
348 4,977,821
4,977,822
355 4,977,823
449 4,977,824
476 4,977,825
516 4,977,826

CLASS 099

323 4,977,820

CLASS 100

7 4,977,827

CLASS 101

142 4,977,828
292 4,977,829
350 4,977,830
365 4,977,831
4,977,832
415.1 4,977,833

CLASS 102

439 4,977,834

CLASS 105

199.4 4,977,835

CLASS 106

14.41 4,978,389
19 4,978,390
35 4,978,391
95 4,978,392
281.1 4,978,393
404 4,978,394
436 4,978,396
499 4,978,395

CLASS 108

55.1 4,977,836

CLASS 110

165 A 4,977,837
173 R 4,977,838
346 4,977,839
4,977,840

CLASS 111

62 4,977,841

CLASS 112

199 4,977,842

CLASS 114

109 4,977,843
123 4,977,844
230 4,977,846
274 4,977,847
289 4,977,845
363 4,977,848

CLASS 116

28 R 4,977,849
109 4,977,850
209 4,977,851

CLASS 118

411 4,977,852
665 4,977,853
683 4,977,854
722 4,977,855

CLASS 119

14.03 4,977,856
19 4,977,857
51.5 4,977,858
52.2 4,977,859
109 4,977,860

CLASS 122

483 4,977,861

CLASS 123

41.12 4,977,862
41.69 4,977,863
50 B 4,977,864
52 MB 4,977,865
52 MV 4,977,866
90.49 4,977,867
182 4,977,868
188 S 4,977,869
195 C 4,977,870
196 A 4,977,871
198 A 4,977,872
198 F Re.33,499
267 4,977,873
269 4,977,874
299 4,977,875
333 4,977,876
335 4,977,877
339 4,977,878
376 4,977,879
488 4,977,880
489 4,977,881
502 4,977,882
644 4,977,883

CLASS 126

299 R 4,977,884
362 4,977,885

CLASS 127

46.2 4,978,397

CLASS 128

4 4,977,886
4,977,887
24 A 4,977,888
30.2 4,977,889
77 4,977,890
80 H 4,977,891
156 4,977,892
157 4,977,893
207.15 4,977,894
421 4,977,895
653 R 4,977,896
662.05 4,977,897
662.06 4,977,898
702 4,977,899
751 4,977,900
772 4,977,901
804 4,977,902
842 4,977,903
856 4,977,904
861 4,977,905
885 4,977,906

CLASS 131

290 4,977,907
375 4,977,908

CLASS 132

123 4,977,909

CLASS 134

7 4,977,910
34 4,977,911
104.4 4,977,912

CLASS 135

20 4,978,110
24 4,977,913
81 4,977,914

CLASS 137

4 4,977,915
8 4,977,916
70 4,977,918
218 4,977,920
266 4,977,921
269 4,977,922
414 4,977,923
454.2 4,977,924
489.5 4,977,925
512.1 4,977,926
539 4,977,927
596 4,977,928
597 4,977,917
863 4,977,929

CLASS 138

89 4,977,930
154 4,977,931

CLASS 139

449 4,977,932
459 4,977,933

CLASS 140

147 4,977,934

CLASS 141

99 4,977,935
114 Re.33,491
312 4,977,936

CLASS 144

134 D 4,977,938
176 4,977,939
241 4,977,937
255 4,977,940

CLASS 148

101 4,978,398
250 4,978,399

CLASS 149

21 4,978,400

CLASS 150

112 4,977,941

CLASS 152

209.00 B 4,977,942

CLASS 156

64 4,978,401
77 4,978,402
97 4,978,403
098 4,978,404
107 4,978,405
190 4,978,406
216 4,978,407
281 4,978,408
315 4,978,409
325 4,978,410
336 4,978,411
345 4,978,412
446 4,978,413
494 4,978,414
517 4,978,415
571 4,978,416
574 4,978,417
628 4,978,418
643 4,978,419
4,978,420
645 4,978,421
656 4,978,422
659.1 4,978,423
664 4,978,424

CLASS 162

4 4,977,943
49 4,978,425
65 4,978,426
168.2 4,978,427
358 4,978,428

CLASS 164

57.1 4,977,946
71.1 4,977,947
186 4,977,944
235 4,977,945
255 4,977,948
417 4,977,949
429 4,977,950
453 4,977,951

CLASS 165

10 4,977,952
4,977,953
76 4,977,954
170 4,977,955
176 4,977,956

CLASS 166

55.6 4,978,260
205 4,977,958
274 4,977,959
4,977,960
297 4,977,961
305.1 4,977,962
321 4,977,957

CLASS 169

37 4,977,963

CLASS 172

310 4,977,964

CLASS 173

81 4,977,965
159 4,977,966

CLASS 174

35 M S 4,978,812
117 F 4,978,813
130 R 4,978,814

CLASS 175

45 4,977,967

CLASS 177

50 4,977,969
245 4,977,968

CLASS 180

6.2 4,977,970
8.3 4,977,971
24.04 4,977,972
271 4,977,973

CLASS 181

129 4,977,975
130 4,977,976
235 4,977,977

CLASS 184

1.5 4,977,978
15.1 4,977,979

CLASS 187

1 R 4,977,980
41 4,977,981
89 4,977,982
95 4,977,983
134 4,977,984

CLASS 188

71.1 4,977,985
73.1 4,977,986
264 G 4,977,987

CLASS 192

0.052 4,977,988
0.073 4,977,992
56 R 4,977,989
58 B 4,977,990
70.19 4,977,991

CLASS 193

45 4,977,993

CLASS 194

210 4,977,994
235 4,977,995

CLASS 198

349 95 4,977,996
374 4,977,997
395 4,977,998
463.3 4,977,999
641 4,978,000

CLASS 200

11 TC 4,978,815
43.14 4,978,816
50 A 4,978,817
80 R 4,978,819
82 D 4,978,820
83 W 4,978,821
302.1 4,978,822
406 4,978,818
437 4,978,823
447 4,978,824

CLASS 202

172 4,978,429

CLASS 203

014.000 4,978,430

CLASS 204

28 4,978,431
58.4 4,978,432
92 4,978,433
153.1 4,978,434
157.94 4,978,435
165 4,978,436
192.23 4,978,437
192.31 4,978,588
265 4,978,438

CLASS 206

45.11 4,978,001
201 4,978,002
217 4,978,003
224 4,978,004
312 4,978,005
449 4,978,006
469 4,978,007
574 4,978,008
620 4,978,009

CLASS 208

91 4,978,439
113 4,978,440
4,978,441

CLASS 209

215 4,978,442
663 4,978,010
684 4,978,443
694 4,978,011

CLASS 210

169 4,978,444
173 Re.33,492
195.3 4,978,445
206 4,978,446
241 4,978,447
242.3 4,978,448
264 4,978,449
488 4,978,450
500.27 4,978,451
510.1 4,978,452
636 4,978,453
640 4,978,454
654 4,978,455
699 4,978,456
747 4,978,457
748 4,978,458
749 4,978,459

CLASS 211

49.1 4,978,012
181 4,978,013
195 4,978,014

CLASS 215

1 C 4,978,015
252 4,978,016
4,978,017

CLASS 219

10.81 4,978,826
69.11 4,978,827
69.12 4,978,828
69.13 4,978,829
104.3 4,978,825
121.63 4,978,834
121.64 4,978,835
121.67 4,978,830
137.61 4,978,831
388 4,978,836
497 4,978,837
4,978,838

CLASS 220

1 T 4,978,018
4 C 4,978,019
7 4,978,020
8 4,978,021
23 4,978,022
23.6 4,978,023
90.4 4,978,024
214 4,978,026
366 4,978,027
403 4,978,028

CLASS 221

3 4,978,030
102 4,978,031
119 4,978,032

CLASS 222

1 4,978,029
94 4,978,033
102 4,978,034
105 4,978,025
108 4,978,035
207 4,978,036
260 4,978,037
402.19 4,978,038
592 4,978,039
598 4,978,040
608 4,978,041
642 4,978,042

CLASS 223

88 4,978,043

CLASS 224

202 4,978,044

CLASS 227

1 4,978,045
4 4,978,046
147 4,978,047
149 4,978,048
178 4,978,049

CLASS 228

4.5 4,978,050
122 4,978,051
123 4,978,052
149 4,978,053
194 4,978,054

CLASS 229

72 4,978,055
123.2 4,978,056

CLASS 232

35 4,978,057

CLASS 235

375 4,978,839
492 4,978,840

CLASS 236

12.12 4,978,058
12.17 4,978,059
34.5 4,978,060
49.3 4,978,061
92 B 4,978,062

CLASS 237

8 R 4,978,063
12.3 A 4,978,064

CLASS 238

366 4,978,065

CLASS 239

12 4,978,066
102.2 4,978,067
129 4,978,068
224 4,978,069
230 4,978,070
265.19 4,978,071
346 4,978,072
419.3 4,978,073
585 4,978,074
690 4,978,075

CLASS 241

5 4,978,076
30 4,978,077
74 4,978,078
81 4,978,079
101.2 4,978,080

CLASS 242

35.50 R 4,978,081
46.4 4,978,082
56.9 4,978,083
74 4,978,084
85 4,978,085
107 4,978,086
107.4 A 4,978,087

CLASS 244

3.24 4,978,088
129.5 4,978,089

CLASS 248

74.1 4,978,090
74.3 4,978,091
205.1 4,978,092
4,978,093
261 4,978,094
312 4,978,095
451 4,978,096
503.1 4,978,097
523 4,978,098

CLASS 249

48 4,978,099

CLASS 250

213 A 4,978,842
216 4,978,843
4,978,844
222.1 4,978,845
227.11 4,978,850
231.13 4,978,846
231.14 4,978,847
231.16 4,978,848
235 4,978,849
270 4,978,851
282 4,978,852
310 4,978,855
4,978,856
336.2 4,978,853
343 Re.33,493
361 C 4,978,854
548 4,978,841
551 4,978,857
560 4,978,858
4,978,859
568 4,978,860
571 4,978,861
572 4,978,862
574 4,978,863

CLASS 251

8 4,978,100
129.15 4,978,101
205 4,977,919
324 4,978,102

CLASS 252

2 4,978,460
8.511 4,978,461
8.6 4,978,462
12 4,978,463
42.7 4,978,464
48.4 4,978,465
49.3 4,978,466
69 4,978,467
79 4,978,468
170 4,978,469
174.12 4,978,470
174.15 4,978,471
299.01 4,978,476
301.4 H 4,978,472
500 4,978,473
4,978,474
549 4,978,475
626 4,978,477

CLASS 254

131 4,978,103
420 4,978,104

CLASS 261

35 4,978,478
121.3 4,978,479

CLASS 264

0.5 4,978,480
1.4 4,978,481
3.1 4,978,482
4.32 4,978,483
40.1 4,978,484
40.2 4,978,485
41 4,978,486
60 4,978,487
72 4,978,488
118 4,978,489
148 4,978,490
154 4,978,491
180 4,978,492
255 4,978,493

CLASS 266

143 4,978,105
177 4,978,106
201 4,978,107
220 4,978,108
274 4,978,109

CLASS 271

3.1 4,978,111
9 4,978,112
10 4,978,113
35 4,978,114
124 4,978,115
206 4,978,117
275 4,978,118
291 4,978,116

CLASS 272

71 4,978,119
85 4,978,120
123 4,978,122

CLASS 273

26 A 4,978,121
73 R 4,978,123
129 S 4,978,124
144 B 4,978,125
153 S 4,978,126
176 H 4,978,127
237 4,978,129
248 4,978,128
423 4,978,130

CLASS 280

47.131 4,978,132
91 4,978,131
484 4,978,133
491.4 4,978,134
707 4,978,135
751 4,978,136
775 4,978,137
777 4,978,138
805 4,978,139
810 4,978,140

CLASS 281

15.1 4,978,141

CLASS 282

11.5 A 4,978,142

CLASS 283

38 4,978,143
70 4,978,144
71 4,978,145
81 4,978,146

CLASS 285

2 4,978,147
133.1 4,978,148
256 4,978,149
304 4,978,150

CLASS 290

48 4,978,864

CLASS 292

21 4,978,151
169 4,978,152
201 4,978,153
4,978,154
336.3 4,978,155

CLASS 294

1.1 4,978,156

CLASS 296

63 4,978,157
65.1 4,978,158
97.6 4,978,159
97.8 4,978,160
180.1 4,978,161
180.2 4,978,162
190 4,978,163
197 4,978,164
216 4,978,165

CLASS 297

184 4,978,166
195 4,978,167
248 4,978,168
410 4,978,169
411 4,978,170
417 4,978,171

CLASS 299

12 4,978,172
81 4,978,173
91 Re.33,494

CLASS 301

37 R 4,978,174
104 4,978,176
121 4,978,175

CLASS 303

3 4,978,177
13 4,978,178
33 4,978,179

CLASS 307

140 4,978,865
228 4,978,866
296.6 4,978,867
296.600 4,978,868
443 4,978,869
475 4,978,870
4,978,871
490 4,978,872
498 4,978,873

CLASS 310

83 4,978,874
88 4,978,875
239 4,978,876
4,978,877
268 4,978,878
313 A 4,978,879
324 4,978,880
328 4,978,881
4,978,882
329 4,978,883

CLASS 313

25 4,978,884
103 CM 4,978,885
414 4,978,886
635 4,978,887

CLASS 315

58 4,978,888
73 4,978,180
111.21 4,978,889
117 4,978,890
4,978,891
150 4,978,893
358 4,978,892

CLASS 318

254 4,978,895
4,978,896
268 4,978,897
269 4,978,899
280 4,978,898
560 4,978,900
600 4,978,901
608 4,978,902
768 4,978,894
778 4,978,903

CLASS 323

313 4,978,904
314 4,978,905
361 4,978,906

CLASS 324

72.5 4,978,907
77 B 4,978,909
96 4,978,910
142 4,978,911
158 F 4,978,913
4,978,914
158 P 4,978,912
158 R 4,978,908
4,978,915
212 4,978,916
226 4,978,917
309 4,978,918
313 4,978,919
318 4,978,920
446 4,978,921
652 4,978,922
693 4,978,923

CLASS 330

254 4,978,924
277 4,978,925
279 4,978,926

CLASS 331

57 4,978,927
107 G 4,978,928
173 4,978,929
176 4,978,930

CLASS 333

28 R 4,978,931
81 R 4,978,932
117 4,978,933
241 4,978,934

CLASS 335

121 4,978,935
216 4,978,936

CLASS 337

372 4,978,937

CLASS 338

32 R 4,978,938
176 4,978,939

CLASS 340

426 4,978,940
447 4,978,941
556 4,978,942
566 4,978,943
573 4,978,946
611 4,978,947
690 4,978,948
711 4,978,949
783 4,978,950
784 4,978,951
795 4,978,952
825.16 4,978,953
825.440 4,978,944
961 4,978,945

CLASS 341

1 4,978,954
109 4,978,955
155 4,978,956
156 4,978,957
159 4,978,958
161 4,978,959

CLASS 342

25 4,978,960
4,978,961
351 4,978,962
433 4,978,963

CLASS 343

715 4,978,964
727 4,978,965
781 R 4,978,967
788 4,978,966

CLASS 346

1.1 4,978,968
4,978,969
4,978,970
4,978,971
76 PH Re.33,496
4,978,972
4,978,973
107 R 4,978,974
108 4,978,975
4,978,976
4,978,977

110 R 4,978,978
140 R 4,978,979
150 4,978,980

CLASS 350

1.7 4,978,181
3.67 4,978,183
3.7 4,978,182
6.3 4,978,184
6.8 4,978,185
96.10 4,978,186
96.11 4,978,187
96.12 4,978,188
4,978,189
96.18 4,978,190
96.20 4,978,191
96.21 4,978,192
4,978,193
96.23 4,978,194
96.27 4,978,195
174 4,978,196
4,978,197
259 4,978,198
286 4,978,199
287 4,978,200
320 4,978,201
331 R 4,978,202
339 R 4,978,203
423 4,978,204
4,978,205
543 4,978,206
631 4,978,207

CLASS 351

45 4,978,208
153 4,978,209
157 4,978,210
159 4,978,211
212 4,978,212
4,978,213

CLASS 353

14 4,978,214
26 R 4,978,215
28 4,978,216
119 4,978,217
4,978,218

CLASS 354

21 4,978,982
76 4,978,983
81 4,978,984
275 4,978,985
295 4,978,986
322 4,978,987
406 4,978,988
410 4,978,981
413 4,978,989
432 4,978,990
436 4,978,991

CLASS 355

51 4,978,992
58 4,978,993
70 4,978,994
206 4,978,995
231 4,978,996
253 4,978,997
273 4,978,998
299 4,978,999
315 4,979,000

CLASS 356

4 4,978,221
349 4,978,219
374 4,978,222
384 4,978,223
394 4,978,220
4,978,224
432 4,978,225

CLASS 357

13 4,979,001
17 4,979,002
22 4,979,003
23.5 4,979,004
23.7 4,979,006
30 4,979,007
34 4,979,008
4,979,009
4,979,010
38 4,979,011
40 4,979,012
55 4,979,013
56 4,979,014
69 4,979,015
70 4,979,016
4,979,017
71 4,979,018
80 4,979,019
235 4,979,005

CLASS 358

12 4,979,020
22 4,979,021
4,979,022
31 4,979,023
37 4,979,024
40 4,979,025
56 4,979,030
64 4,979,026
75 4,979,027
4,979,031
76 4,978,226
4,979,032
85 4,979,028
92 4,979,033
93 4,979,029
4,979,034
98 4,979,035
105 4,979,036
133 4,979,037
4,979,038
4,979,039
138 4,979,040
141 4,979,041
163 4,979,042
167 4,979,043
168 4,979,044
227 4,979,045
330 4,979,046
335 4,979,047
342 4,979,048
426 4,979,049

CLASS 360

14.1 4,979,050
21 4,979,051
32 4,979,052
46 4,979,053
48 4,979,054
69 4,979,055
4,979,056
71 4,979,057
74.2 4,979,058
78.090 4,979,059
92 4,979,060
96.5 4,979,061
97.02 4,979,062
106 4,979,063
125 4,979,064
133 4,979,065

CLASS 361

10 4,979,066
18 4,979,067
4,979,068
31 4,979,069
42 4,979,070
56 4,979,071
87 4,979,072
386 4,979,073
4,979,074
399 4,979,075
401 4,979,076

CLASS 362

61 4,979,077
125 4,979,078
135 4,979,079
154 4,979,080
219 4,979,081
226 4,979,082
252 4,979,085
297 4,979,086
394 4,979,083
457 4,979,084

CLASS 363

34 4,979,087
060 4,979,088
132 4,979,089
141 4,979,090

CLASS 364

148 4,979,091
4,979,092
167.01 4,979,093
188 4,979,094
200 4,979,095
4,979,096
4,979,097
4,979,098
4,979,099
4,979,100
4,979,101
4,979,102
4,979,103
4,979,104
4,979,105
4,979,106
4,979,107
4,979,108
4,979,109
413.03 4,979,110
413.16 4,979,111
422 4,979,112
424.02 4,979,113
424.05 4,979,114
4,979,115
4,979,116
431.07 4,979,117
436 4,979,118
442 4,979,119
474.09 4,979,120
474.36 4,979,121
483 4,979,122
498 4,979,123
507 4,979,124
4,979,125
513 4,979,126
4,979,127
4,979,128
518 4,979,129
4,979,130
519 4,979,131
520 4,979,132
557 4,979,133
4,979,134
571.01 4,979,135
572 4,979,136
578 4,979,137
713 4,979,138
715.01 4,979,139
767 4,979,142
786 4,979,140
787 4,979,141
900 4,979,143
4,979,144
4,979,145

CLASS 365

185 4,979,146
189.04 4,979,147
230.01 4,979,148
244 4,979,149

CLASS 366

101 4,978,227
138 4,978,228

CLASS 367

24 4,979,150
35 4,979,151
77 4,979,152
93 4,979,153
116 4,979,154

CLASS 368

80 4,979,155
276 4,979,157
289 4,979,156

CLASS 369

10 Re.33,497
58 4,979,159
75.2 4,979,160
77.2 4,979,161
013 4,979,158
116 4,979,162

CLASS 370

32.1 4,979,163
58.1 4,979,164
60 4,979,165
84 4,979,166
85.4 4,979,167
95.1 4,979,168
99 4,979,169
104.1 4,979,170
110.2 4,979,171

CLASS 371

16.1 4,979,172
39.1 4,979,173
41 4,979,174
43 4,979,175

CLASS 372

13 4,979,176
20 4,979,178
88 4,979,179
92 4,979,180
98 4,979,181

CLASS 373

138 4,979,182

CLASS 374

30 4,978,229
43 4,978,230

CLASS 375

1 4,979,183
13 4,979,184
20 4,979,185
23 4,979,186
27 4,979,187
34 4,979,188
95 4,979,189
106 4,979,190
108 4,979,191
111 4,979,192

CLASS 376

235 4,978,494
261 4,978,495
280 4,978,496
290 4,978,497

CLASS 377

20 4,979,177
29 4,979,193
55 4,979,194

CLASS 378

34 4,979,195
37 4,979,196
90 4,979,197
102 4,979,198
121 4,979,199
185 4,979,200
4,979,201
198 4,979,202
206 4,979,203

CLASS 379

46 4,979,204
61 4,979,205
67 4,979,206
112 4,979,207
145 4,979,208
399 4,979,209

CLASS 380

3 4,979,210

CLASS 381

43 4,979,211
4,979,213
45 4,979,212
46 4,979,214
49 4,979,215
52 4,979,216
81 4,979,217
94 4,979,218
190 4,979,219
192 4,979,220

CLASS 382

1 4,979,221
6 4,979,222
8 4,979,223
4,979,224
17 4,979,225
21 4,979,226
40 4,979,227
54 4,979,228
56 4,979,229

CLASS 383

11 4,978,231
33 4,978,232

CLASS 384

12 4,978,233
448 4,978,234
450 4,978,235
480 4,978,236
580 4,978,237

CLASS 388

809 Re.33,500

CLASS 392

400 4,978,832
449 4,978,833

CLASS 400

124 4,978,238
4,978,239
224.2 4,978,240
630 Re.33,498

CLASS 401

118 4,978,241
129 4,978,242

CLASS 403

24 4,978,243
379 4,978,244

CLASS 404

6 4,978,245
84 4,978,246

CLASS 405

15 4,978,247
292 4,978,248
303 4,978,249
4,978,250

CLASS 406

50 4,978,251
64 4,978,252
88 4,978,253

CLASS 407

33 4,978,254

CLASS 408

1 R 4,978,255
72 R 4,978,256
111 4,978,257
187 4,978,258

CLASS 409

132 4,978,259
218 4,978,261
233 4,978,262
307 4,978,263

CLASS 411

26 4,978,264
60 4,978,265
61 4,978,266
511 4,978,270

CLASS 412

21 4,978,267

CLASS 414

409 4,978,268
421 4,978,269
487 4,978,271
529 4,978,272
697 4,978,273
744.3 4,978,274
789.5 4,978,275

CLASS 415

55.3 4,978,276
57.1 4,978,277
144 4,978,278
151 4,978,279
159 4,978,280

CLASS 416

89 4,978,286

CLASS 417

360 4,978,282
423.15 4,978,281
511 4,978,283
534 4,978,284
569 4,978,285

CLASS 418

96 4,978,287

CLASS 419

37 4,978,498

CLASS 420

87 4,978,499

CLASS 422

7 4,978,500
22 4,978,501
58 4,978,502
4,978,503
61 4,978,504
66 4,978,505
73 4,978,506
100 4,978,507
186.08 4,978,508
245 4,978,509
310 4,978,510

CLASS 423

65 4,978,511
226 4,978,512
235 4,978,514
245.3 4,978,513
263 4,978,515
331 4,978,516
479 4,978,517
504 4,978,518
574 R 4,978,519

CLASS 424

1.1 4,978,520
7.1 4,978,521
52 4,978,522
59 4,978,523
64 4,978,524
70 4,978,525
4,978,526
78 4,978,527
94.4 4,978,528
195.1 4,978,529
413 4,978,530
448 4,978,531
4,978,532
456 4,978,533
484 4,978,534
661 4,978,535
684 4,978,536

CLASS 425

141 4,978,289
147 4,978,290
311 4,978,288

CLASS 426

5 4,978,537
8 4,978,538
11 4,978,539
61 4,978,540
92 4,978,541
243 4,978,542
4,978,543
4,978,544
4,978,545
4,978,546
4,978,547
4,978,548
4,978,549
4,978,550
4,978,552
573 4,978,551
603 4,978,553
604 4,978,554
627 4,978,555

CLASS 427

37 4,978,556
4,978,557
250 4,978,558
304 4,978,559
366 4,978,560
387 4,978,561

CLASS 428

35.8 4,978,562
63 4,978,563
71 4,978,564
156 4,978,565
157 4,978,566
4,978,567
192 4,978,568
209 4,978,569
231 4,978,570
263 4,978,571
323 4,978,572
333 4,978,573
4,978,574
402 4,978,575
409 4,978,576
4,978,577
412 4,978,578
483 4,978,579
484 4,978,580
492 4,978,581
551 4,978,582
600 4,978,583
611 4,978,584
614 4,978,585
625 4,978,586
645 4,978,587

CLASS 429

26 4,978,589
35 4,978,590
4,978,591
89 4,978,592
218 4,978,600
245 4,978,601

CLASS 430

2 4,978,593
14 4,978,594
106.6 4,978,595
109 4,978,596
122 4,978,597
137 4,978,598
139 4,978,599
264 4,978,602
265 4,978,603
327 4,978,604
505 4,978,606
557 4,978,605
642 4,978,607

CLASS 431

12 4,978,291
75 4,978,292
258 4,978,293

CLASS 432

103 4,978,294
120 4,978,295

CLASS 433

26 4,978,296
88 4,978,297
213 4,978,298

CLASS 434

58 4,978,299
61 4,978,300
96 4,978,301
153 4,978,302
258 4,978,303
260 4,978,304
353 4,978,305

CLASS 435

6 4,978,608
7 4,978,609
4,978,610
4,978,611
4,978,632
10 4,978,612
18 4,978,613
21 4,978,614
25 4,978,615
70.3 4,978,616
125 4,978,617
162 4,978,618
182 4,978,619
226 4,978,620
243 4,978,621
274 4,978,622
320 4,978,623

CLASS 436

17 4,978,624
518 4,978,625

CLASS 437

24 4,978,631
32 4,978,630
41 4,978,629
44 4,978,626
4,978,627
4,978,628
51 4,978,633
52 4,978,634
4,978,635
150 4,978,636
193 4,978,637
209 4,978,638
230 4,978,639

CLASS 439

8 4,978,306
83 4,978,307
4,978,308
126 4,978,309
188 4,978,310
4,978,311
219 4,978,312
248 4,978,313
398 4,978,314
441 4,978,315
449 4,978,316
490 4,978,317
536 4,978,318
638 4,978,319

CLASS 440

88 4,978,321
052 4,978,320

CLASS 452

187 4,977,643
195 4,977,644

CLASS 453

57 4,978,322

CLASS 455

3 4,979,230
58 4,979,231
78 4,979,232
330 4,979,233
608 4,979,234
616 4,979,235

CLASS 464

68 4,978,324
111 4,978,325

CLASS 474

135 4,978,326
228 4,978,327

CLASS 475

66 4,978,328
84 4,978,329

CLASS 493

466 4,978,330

CLASS 494

37 4,978,331

CLASS 501

32 4,978,640
39 4,978,641
84 4,978,642
94 4,978,643
96 4,978,644
98 4,978,645
134 4,978,646

CLASS 502

7 4,978,647
127 4,978,648
416 4,978,649
432 4,978,650

CLASS 503

216 4,978,651
227 4,978,652

CLASS 512

21 4,978,653

CLASS 514

31 4,978,654
50 4,978,655
63 4,978,656
175 4,978,657
178 4,978,658
210 4,978,659
215 4,978,660
224.5 4,978,661
231.8 4,978,663
235.2 4,978,664
235.8 4,978,662
247 4,978,665
255 4,978,666
258 4,978,667
4,978,668
292 4,978,669
345 4,978,670
366 4,978,671
383 4,978,672
411 4,978,673
445 4,978,674
450 4,978,675
4,978,676
4,978,677
455 4,978,678
468 4,978,679
534 4,978,680
557 4,978,681
616 4,978,682
617 4,978,683
632 4,978,684
642 4,978,685
698 4,978,686
708 4,978,687
722 4,978,688

CLASS 518

709 4,978,689

CLASS 521

54 4,978,690
172 4,978,691
185 4,978,692

CLASS 522

137 4,978,693

CLASS 523

173 4,978,694
201 4,978,695
212 4,978,696

CLASS 524

27 4,978,697
62 4,978,698
156 4,978,700
265 4,978,701
266 4,978,702
298 4,978,703
404 4,978,704
417 4,978,705
423 4,978,706
504 4,978,707
507 4,978,708
606 4,978,709
837 4,978,710
841 4,978,711

CLASS 525

51 4,978,712
61 4,978,713
69 4,978,714
92 4,978,715
195 4,978,716
4,978,717
239 4,978,718
255 4,978,722
275 4,978,719
288 4,978,720
289 4,978,721
326.5 4,978,723
350 4,978,724
399 4,978,725
479 4,978,726
504 4,978,727
528 4,978,728
537 4,978,729

CLASS 526

153 4,978,730

CLASS 528

15 4,978,731
71 4,978,732
170 4,978,733
184 4,978,734
193 4,978,735
220 4,978,736
4,978,737
4,978,738
271 4,978,739
272 4,978,740
279 4,978,741
353 4,978,742
499 4,978,743

CLASS 529

99 4,978,699

CLASS 530

330 4,978,744
387 4,978,745

CLASS 534

632 4,978,746
735 4,978,747

CLASS 536

17.5 4,978,748
27 4,978,749
114 4,978,750
123 4,978,751

CLASS 540

222 4,978,752
559 4,978,753

CLASS 544

176 4,978,754

CLASS 546

37 4,978,755
209 Re.33,495

CLASS 548

171 4,978,756
309 4,978,758
421 4,978,757
497 4,978,759

CLASS 549

246 4,978,760
462 4,978,761
463 4,978,762

CLASS 556

50 4,978,763

CLASS 558

319 4,978,764
324 4,978,765
353 4,978,766
402 4,978,767
416 4,978,768
423 4,978,769
455 4,978,770
459 4,978,771

CLASS 560

45 4,978,772
47 4,978,773
53 4,978,774
119 4,978,775
214 4,978,776
224 4,978,777
261 4,978,778
344 4,978,779

CLASS 562

42 4,978,780
102 4,978,781
125 4,978,782
431 4,978,783
470 4,978,784
537 4,978,785

CLASS 564

160 4,978,786
218 4,978,787
265 4,978,788
305 4,978,789
315 4,978,790
335 4,978,791
384 4,978,792
487 4,978,793

CLASS 568

1 4,978,794
56 4,978,795
68 4,978,796
315 4,978,797
316 4,978,798
385 4,978,799
4,978,800
428 4,978,801
432 4,978,802
486 4,978,803
489 4,978,804
622 4,978,805
667 4,978,806
697 4,978,807
707 4,978,808
720 4,978,809
4,978,810
734 4,978,811

CLASS 600

12 4,978,323

CLASS 604

19 4,978,332
22 4,978,333
51 4,978,334
67 4,978,335
82 4,978,336
85 4,978,337
93 4,978,338
110 4,978,339
167 4,978,341
180 4,978,342
195 4,978,340
4,978,343
198 4,978,344
384 4,978,345

CLASS 606

27 4,978,346
54 4,978,347
57 4,978,348
67 4,978,349
72 4,978,350
98 4,978,351
166 4,978,352

CLASS 623

6 4,978,353
4,978,354
16 4,978,355
18 4,978,356
4,978,357
23 4,978,358
4,978,359
66 4,978,360

CLASSIFICATION OF DESIGNS

D1— 118 312,913
122 312,914
D2— 250 312,915
314 312,916
312,917
312,918
312,919
320 312,920
639 312,921
D3— 34 312,922
D6— 300 312,923
301 312,924
314 312,925
335 312,926
423 312,927
429 312,928
465 312,929
475 312,930
491 312,931
496 312,932
502 312,933
519 312,934
549 312,935
552 312,936
312,937
569 312,938
571 312,940
602 312,939
D7— 303 312,942
330 312,943
351 312,944
312,945
504 312,946
507 312,947
545 312,941
585 312,948
598 312,949
694 312,950
D8— 1 312,951
52 312,952
60 312,953
82 312,954
102 312,955
308 312,956
341 312,957
346 312,958
367 312,959
312,960
373 312,961
381 312,962
D9— 310 312,963
376 312,964
377 312,965
384 312,966
408 312,967
431 312,968
438 312,969
D10— 6 312,970
10 312,971
28 312,972
39 312,973
50 312,974
57 312,975
72 312,976
109 312,977
114 312,978
312,979
132 312,980
D11— 83 312,981
87 312,982
156 312,983
213 312,984
312,985
216 312,986
218 312,987
221 312,988
D12— 87 312,989
101 312,990
108 312,991
128 312,992
146 312,993
312,994
147 312,995
157 312,996
205 312,997
312,998
307 313,000
313,001
317 313,002
313,003
D13— 108 313,004
134 313,005
147 313,006
313,007
313,008
313,009
157 313,010
D14— 100 313,011
313,012
313,013
102 313,014
313,015
108 313,016
135 313,017
156 313,018
188 313,019
192 313,020
196 313,021
214 313,022
258 313,023
265 313,024
D15— 21 313,025
83 313,026
130 313,028
142 313,027
D16— 133 313,029
242 313,030
D17— 1 313,031
313,032
313,033
313,034
313,035
20 313,036
D18— 36 313,037
313,038
37 313,039
D19— 3 313,040
34.1 313,048
42 313,041
48 313,042
59 313,043
313,044
60 313,045
78 313,046
99 313,047
D20— 2 313,049
40 313,050
D21— 37 313,051
41 313,052
171 313,053
313,054
194 313,055
213 312,999
217 313,056
252 313,058
D22— 107 313,059
134 313,060
313,061
D23— 207 313,062
213 313,063
226 313,064
242 313,065
313,066
262 313,067
294 313,068
335 313,069
346 313,070
364 313,071
417 313,072
D24— 2 313,073
26 313,074
47 313,075
50 313,076
51 313,103
D25— 16 313,077
60 313,078
103 313,079
313,080
313,081
D26— 24 313,082
65 313,083
113 313,084
142 313,085
156 313,086
D27— 20 313,087
25 313,088
38 313,089
49 313,090
64 313,091
D29— 17 313,092
D30— 122 313,093
D32— 19 313,094
22 313,095
34 313,096
71 313,097
D34— 2 313,098
17 313,099
28 313,100
29 313,101
32 313,102
D99— 29 313,104
313,105
31 313,106

CLASSIFICATION OF PLANTS

P.— 34 7,396
68 7,397
7,398
7,399
7,400
7,401

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,978,057
4,978,700
4,979,186
04 : 4,977,867
4,977,975
4,978,249
4,978,257
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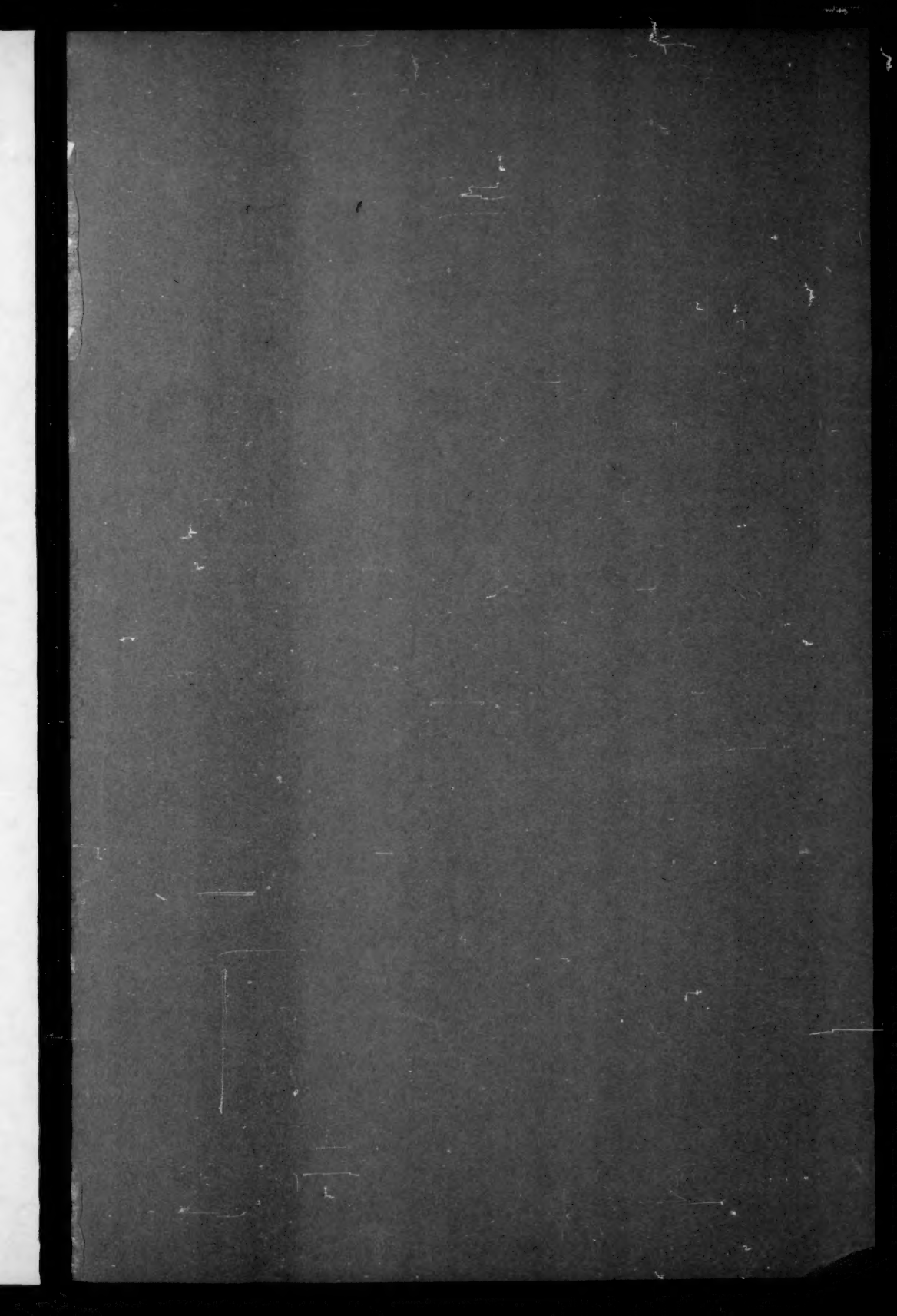

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